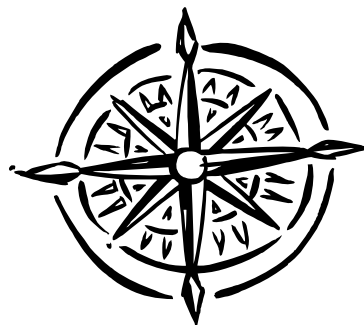


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CATEGORY: DIAGNOSTIC AND IMAGING SYSTEMS

PUB ID DOE/BC/14938-16 **ORDER #** 776907

TITLE *Advanced Reservoir Characterization in the Antelope Shale to Establish the Viability of CO₂ Enhanced Oil Recovery in California's Monterey Formation Siliceous Shales, Class III*, Annual Report, February 7, 2000-February 6, 2001, 163 pp.

PUB DATE 04/02/2001

CONTRACTOR Chevron USA Production Company

This report describes the evaluation, design, and implementation of a DOE funded CO₂ pilot project in the Lost Hills Field, Kern County, California. The pilot consists of four inverted (injector-centered) 5-spot patterns covering approximately 10 acres, and is located in a portion of the field, which has been under waterflood since early 1992. The target reservoir for the CO₂ pilot is the Belridge Diatomite. The pilot location was selected based on geology, reservoir quality and reservoir performance during the waterflood. A CO₂ pilot was chosen, rather than full-field implementation, to investigate uncertainties associated with CO₂ utilization rate and premature CO₂ breakthrough, and overall uncertainty in the unproven CO₂ flood process in the San Joaquin Valley.

PUB ID DOE/BC/14941-19 **ORDER #** 791819

TITLE *Advanced Oil Recovery Technologies for Improved Recovery from Slope Basin Clastic Reservoirs, Nash Draw Brushy Canyon Pool, Eddy County, New Mexico, Class III*, Annual Report, October 1, 2000-September 30, 2001, 15 pp.

PUB DATE 02/21/2001

CONTRACTOR Strata Production Company

The overall objective of this project is to demonstrate that a development program based on advanced reservoir management methods can significantly improve oil recovery at the Nash Draw Pool (NDP). The plan includes developing a control area using standard reservoir management techniques and comparing its performance to an area developed using advanced reservoir management methods. Specific goals are (1) to demonstrate that an advanced development drilling (horizontal) and pressure maintenance program can significantly improve oil recovery compared to existing technology applications and (2) to transfer these advanced methodologies to oil and gas producers in the Permian Basin and elsewhere throughout the U.S. oil and gas industry.

PUB ID DOE/BC/14942-12 **ORDER #** 788818
TITLE *Advanced Reservoir Characterization and Evaluation of CO₂ Gravity Drainage in the Naturally Fractured Spraberry Trend Area, Class III*, Annual Report, September 1, 2000-August 31, 2001, 84 pp.

PUB DATE 11/26/2001

CONTRACTOR Pioneer Natural Resources

The goal of this project was to assess the economic feasibility of CO₂ flooding the naturally fractured Spraberry Trend Area in west Texas. This objective was accomplished through research in four areas: (1) extensive characterization of the reservoirs, (2) experimental studies of crude oil/brine/rock (COBR) interactions in the reservoirs, (3) reservoir performance analysis and (4) experimental investigations on CO₂ gravity drainage in Spraberry whole cores.

PUB ID DOE/BC/14946-6 **ORDER #** 792247
TITLE *Basin Analysis of the Mississippi Interior Salt Basin and Petroleum System Modeling of the Jurassic Smackover Formation, Eastern Gulf Coastal Plain*, Final and Topical Reports 5-8 on Smackover Petroleum System and Underdevelopment Reservoirs, August 23, 1996-August 22, 2001, 487 pp.

PUB DATE 03/05/2002

CONTRACTOR University of Alabama

The Smackover Formation, a major hydrocarbon-producing horizon in the Mississippi Interior Salt Basin (MISB), conformably overlies the Norphlet Formation and is conformably overlain by the Buckner Anhydrite Member of the Haynesville Formation. The Norphlet-Smackover contact can be either gradational or abrupt. The thickness and lithofacies distribution of the Smackover Formation were controlled by the configuration of incipient paleotopography. The Smackover Formation was subdivided into three informal members, referred to as the lower, middle and upper members.

PUB ID DOE/BC/14991-22 **ORDER #** 791831
TITLE *Design and Implementation of a CO₂ Flood Utilizing Advanced Reservoir Characterization and Horizontal Injection Wells In a Shallow Shelf Carbonate Approaching Waterflood Depletion, Class II*, Annual Report, July 1, 2000-July 2, 2001, 27 pp.

PUB DATE 02/21/2002

CONTRACTOR Phillips Petroleum Company

The principle objective of this project was to demonstrate

the economic viability and widespread applicability of an innovative reservoir management and carbon dioxide (CO₂) flood project development approach for improving CO₂ flood project economics in shallow shelf carbonate (SSC) reservoirs.

PUB ID DOE/BC/15100-2 **ORDER #** 773383
TITLE *Advanced Characterization of Fractured Reservoirs in Carbonate Rocks: The Michigan Basin*, Semi-Annual Report, April 1, 1999-September 31, 1999, 16 pp.

PUB DATE 01/22/2001

CONTRACTOR Michigan Technological University

The main objective of this project was for a university-industry consortium to develop a comprehensive model for fractured carbonate reservoirs based on the "data cube" concept, using the Michigan Basin as a prototype. This project combined traditional historical data with 2D and 3D seismic data as well as data from modern logging tools in a novel way to produce a new methodology for characterizing fractured reservoirs in carbonate rocks. Advanced visualization software was used to fuse the data and to image it on a variety of scales, ranging from basin-scale to well-scales.

PUB ID DOE/BC/15101-1 **ORDER #** 785909
TITLE *Discrete Feature Approach for Heterogeneous Reservoir Production Enhancement*, Semi-Annual Report, January 1, 1999-June 30, 1999, 110 pp.

PUB DATE 08/27/2001

CONTRACTOR Golder Associates Inc.

This progress report describes activities during the period January 1, 1999 to June 30, 1999. Work was carried out on 21 tasks. The major activity during the reporting period was the development and preliminary application of discrete fracture network (DFN) models for Stoney Point, South Oregon Basin, and North Oregon Basins project study sites. In addition, research was carried out on analysis algorithms for discrete future orientation.

PUB ID DOE/BC/15104-1 **ORDER #** 794278
TITLE *Reservoir Characterization of Upper Devonian Gordon Sandstone, Jacksonburg, Stringtown Oil Field, Northwestern West Virginia*, Semi-Annual Report, October 1, 1999-March 31, 2000, 19 pp.

PUB DATE 05/20/2002

CONTRACTOR West Virginia University

This report gives results on use of a minipermeameter on cores to study very finescale trends in permeability, and use of neural networks to predict permeability in logged, uncored wells.

PUB ID DOE/BC/15104-2 **ORDER #** 794279

TITLE *Reservoir Characterization of Upper Devonian Gordon Sandstone, Jacksonburg, Stringtown Oil Field, Northwestern West Virginia, Semi-Annual Report, October 1, 2000-March 31, 2001, 19 pp.*

PUB DATE 05/20/2002

CONTRACTOR West Virginia University

This report gives results of efforts to determine electrofacies from logs; measure permeability in outcrop to study very fine-scale trends; find the correlation between permeability measured by the minipermeameter and in core plugs, define porosity-permeability flow units; and run the BOAST III reservoir simulator using the flow units defined for the Gordon reservoir.

PUB ID DOE/BC/15104-3 **ORDER #** 794280

TITLE *Reservoir Characterization of Upper Devonian Gordon Sandstone, Jacksonburg, Stringtown Oil Field, Northwestern West Virginia, Final Report, October 1, 1998-September 30, 2001, 88 pp.*

PUB DATE 05/20/2002

CONTRACTOR West Virginia University

The purpose of this work was to establish relationships among permeability, geophysical and other data by integrating geologic, geophysical and engineering data into an interdisciplinary quantification of reservoir heterogeneity as it relates to production.

PUB ID DOE/BC/15105-1 **ORDER #** 774007

TITLE *Integrated Outcrop and Subsurface Studies of the Interwell Environment of Carbonate Reservoirs: Clear Fork (Leonardian Age) Reservoirs, West Texas and New Mexico, Semi-Annual Report, March 30, 1999-October 1, 1999, 26 pp.*

PUB DATE 02/01/2001

CONTRACTOR The University of Texas at Austin

Characterization of cycle and facies architecture on lower Clear Fork and lowermost upper Clear Fork equivalent outcrops in Apache Canyon of Sierra Diablo was completed. The focus of detailed study in Apache Canyon has been the upper Clear Fork section because this interval contains the productive interval in South Wason field,

the preliminary subsurface study area. Parts of three high-frequency sequences (HFS), each 60 to 100 ft thick, are present on the south wall of Apache Canyon. HFSs display an upper-deepening or backstepping pattern associated with longer-term sea level rise. Each HFS is composed of upward-shallowing cycles whose thickness, facies composition, and continuity vary within and between HFSs.

PUB ID DOE/BC/15105-2 **ORDER #** 780436

TITLE *Integrated Outcrop and Subsurface Studies of the Interwell Environment of Carbonate Reservoirs: Clear Fork (Leonardian Age) Reservoirs, West Texas and New Mexico, Semi-Annual Report, October 1, 1999-March 31, 2000, 6 pp.*

PUB DATE 05/01/2001

CONTRACTOR The University of Texas at Austin

The timing of dolomite formation relative to fracture formation was the key issue in efforts to predict fracture permeability in the SWCF reservoir. Although synkinematic dolomite was observed, developing criteria for identifying synkinematic dolomite in the matrix remains a problem. The SWCF reservoir is completely dolomitized, and there are most likely multiple periods of dolomitization. Methods for distinguishing the various periods of dolomitization have not yet been established.

PUB ID DOE/BC/15105-3 **ORDER #** 780437

TITLE *Integrated Outcrop and Subsurface Studies of the Interwell Environment of Carbonate Reservoirs: Clear Fork (Leonardian Age) Reservoirs, West Texas and New Mexico, Semi-Annual Report, March 31, 2000-October 1, 2000, 16 pp.*

PUB DATE 05/01/2001

CONTRACTOR The University of Texas at Austin

A preliminary reservoir model was constructed for the Lower Clear Fork of the South Wason Clear Fork reservoir. The model was constructed by calibrating high-frequency cycles observed in cores to the porosity log. The rock fabrics mostly fall in petrophysical Class 1, and cross plots of porosity and water saturation could not be used to identify rock fabrics. Data from two limestone fields and one dolostone field were presented to support the contention that grain-dominated fabrics have higher porosity than mud-dominated fabrics do and that this difference is retained when the limestone is dolomitized.

PUB ID DOE/BC/15105-4 **ORDER #** 780438

TITLE *Integrated Outcrop and Subsurface Studies of the Interwell Environment of Carbonate Reservoirs: Clear Fork (Leonardian Age) Reservoirs, West Texas and New Mexico, Semi-Annual Report, October 1, 2000-March 31, 2001, 15 pp.*

PUB DATE 05/01/2001

CONTRACTOR The University of Texas at Austin

The major goal of this project was to evaluate the impact of fracture porosity on performance of the South Wason Clear Fork reservoir. The approach was to use subcritical crack (SCC) index measurements and a crack-growth simulator to model potential fracture geometries in this reservoir.

PUB ID DOE/BC/15105-5 **ORDER #** 788985

TITLE *Integrated Outcrop and Subsurface Studies of the Interwell Environment of Carbonate Reservoirs: Clear Fork (Leonardian Age) Reservoirs, West Texas and New Mexico, Semi-Annual Report, October 1, 1998-March 31, 1999, 7 pp.*

PUB DATE 11/29/2001

CONTRACTOR The University of Texas at Austin

Outcrop studies include stratigraphic and petrophysical analysis. Analysis of the detailed sequence- and cycle-scale architecture of the Clear Fork reservoir-equivalent outcrops in Apache Canyon reveals two high-frequency transgressive-regressive sequences (HFS) in the lower Clear Fork composite depositional sequence and three HFS in the basal middle Clear Fork composite depositional sequence. A 1,800-ft transect of 1-inch-diameter samples was collected from one cycle at the Apache Canyon outcrop. The transect was sampled with 5-ft spacing, but there were some gaps due to cover and cliff, resulting in 181 samples. Permeability, porosity, and grain density were measured, and the spatial statistics are being analyzed geostatistically.

PUB ID DOE/BC/15115-1 **ORDER #** 794378

TITLE *National Geoscience Data Repository System -- Phase III: Implementation and Operation of the Repository, Semi-Annual Report, November 2001-March 2002, 13 pp.*

PUB DATE 05/28/2002

CONTRACTOR American Geological Institute

The National Geoscience Data Repository System, Phase III was an operational project focused on coordinating and facilitating transfers of at-risk geoscience data from

the private sector to the public domain.

PUB ID DOE/BC/15120-1 **ORDER #** 792461

TITLE *Advanced Reservoir Characterization and Development through High-Resolution 3C3D Seismic and Horizontal Drilling: Eva South Marrow Sand Unit, Texas County, Oklahoma, Class Revisit, Final Report, February 29, 2000-July 31, 2001, 91 pp.*

PUB DATE 03/08/2002

CONTRACTOR Ensign Operating Company

The Eva South Morrow Sand Unit is located in western Texas County, Oklahoma. The field produces from an upper Morrow sandstone, termed the Eva sandstone, deposited in a transgressive valley-fill sequence. The field is defined as a combination structural stratigraphic trap; the reservoir lies in a convex up-dip bend in the valley and is truncated on the west side by the Teepee Creek fault. Although the field has been a successful waterflood since 1993, reservoir heterogeneity and compartmentalization has impeded overall sweep efficiency. A 4.25 square mile high-resolution, three-component three-dimensional (3C3D) seismic survey was acquired in order to improve reservoir characterization and pinpoint the optimal location of a new horizontal producing well, the ESU 13-H.

PUB ID DOE/BC/15122-1 **ORDER #** 784133

TITLE *Using Recent Advances in 2D Seismic Technology and Surface Geochemistry to Economically Redevelop a Shallow Shelf Carbonate Reservoir: Vernon Field, Isabella County, Class Revisit, Annual Report, March 20, 2000-March 20, 2001, 25 pp.*

PUB DATE 08/05/2001

CONTRACTOR Michigan Technological University

A consortium consisting of Cronus Exploration (Traverse City, MI), Michigan Technological University (Houghton, MI) and Western Michigan University (Kalamazoo, MI) are developing an economical and environmentally sensitive plan for recovery of hydrocarbons from an abandoned shallow-shelf carbonate field, typical of many fields in the U.S. Midwest. This is a 5-year project that will use surface geochemistry as a tool to reduce risk in locating and producing hydrocarbons in Class II fields. The project will develop new techniques for measuring hydrocarbon gases in the soil horizon to locate new and bypassed oil in the shallow-shelf carbonate environments typified by the Dundee and Trenton Formations of the Michigan Basin (Fisher et. al. 1988). In Phase I Vernon Oil field located in Vernon Twp, Isabella County, Michigan was drilled to locate bypassed hydrocarbons

from the original field and to locate and produce extensions of the original field.

PUB ID DOE/BC/15135-2 **ORDER #** 790863
TITLE *Calibration of Seismic Attributes for Reservoir Characterization*, Annual Report, October 1, 2000-September 30, 2001, 53 pp.

PUB DATE 01/17/2002

CONTRACTOR Michigan Technological University

This project is beginning a fourth year, designed to expand upon the tech transfer aspects of the project. The Stratton data set, demonstrated that an apparent correlation between attributes derived along 'phantom' horizons are artifacts of isopach changes. The Boonsville data set was used to develop techniques for conventional seismic attributes, including seismic facies generated under various neural network procedures, to subdivide regional facies determined from logs into productive and non-productive subfacies. The Teal South data set provided a surprising set of data. Nearby reservoirs are undergoing a pressure drop in response to the production of the main reservoir, implying that oil is being lost through spill points, never to be produced. The Wamsutter data set provided unconventional attributes including lateral incoherence and horizon-dependent impedance variations to indicate regions of former sand bars and current high pressure, and to evaluation of various upscaling routines.

PUB ID DOE/BC/15135-3 **ORDER #** 794438
TITLE *Calibration of Seismic Attributes for Reservoir Characterization*, Annual Report, October 1, 2001-September 30, 2002, 30 pp.

PUB DATE 05/28/2002

CONTRACTOR Michigan Technological University

This project was intended to enhance the ability to use seismic data for the determination of rock and fluid properties through an improved understanding of the physics underlying the relationships between seismic attributes and formation.

PUB ID DOE/BC/15201-1 **ORDER #** 782900
TITLE *Fluid-Rock Characterization and Interactions in NMR Well Logging*, Annual Report, August 1, 1999-July 31, 2000, 125 pp.

PUB DATE 07/02/2001

CONTRACTOR Rice University

This report characterizes the fluid properties and fluid-

rock interactions that are needed for formation evaluation by NMR well logging.

PUB ID DOE/BC/15201-2 **ORDER #** 782901
TITLE *Fluid-Rock Characterization and Interactions in NMR Well Logging*, Semi-Annual Report, August 1, 2000-December 31, 2000, 28 pp.

PUB DATE 07/13/2001

CONTRACTOR Rice University

The main emphasis on fluid properties was on measurements of the relaxation time and self-diffusion coefficient of ethane and propane. Ethane is similar to methane while propane is more similar to the higher alkanes. The ratio of T1 and T2 is demonstrated to be a function of both viscosity and the NMR frequency. The diffusion-induced T2 in a uniform magnetic gradient was simulated in one dimension to seek improved understanding NMR diffusion in restricted geometry. Analytical solutions can be found for this system if the correct region of validity is used. Estimation of permeability of vuggy carbonates has been problematic because the pore body size does not correlate well with pore throat size. CT scans and CPMG NMR measurements were made on a set of vuggy carbonate rocks.

PUB ID DOE/BC/15203-2 **ORDER #** 773808
TITLE *A Methodology to Integrate Magnetic Resonance and Acoustic Measurements for Reservoir Characterization*, Semi-Annual Report, April 1, 1999-October 31, 1999, 109 pp.

PUB DATE 01/24/2001

CONTRACTOR Southwest Research Institute

The objective of this project was to develop an advanced imaging method, including pore scale imaging, to integrate magnetic resonance (MR) techniques and acoustic measurements to improve predictability of the pay zone in two hydrocarbon reservoirs. This was accomplished by extracting the fluid property parameters using MR laboratory measurements and the elastic parameters of the rock matrix from acoustic measurements to create poroelastic models of different parts of the reservoir. Laboratory measurements were compared with petrographic analysis results to determine the relative roles of petrographic elements such as porosity type, mineralogy, texture, and distribution of clay and cement in creating permeability heterogeneity.

PUB ID DOE/BC/15203-3 **ORDER #** 790861
TITLE *A Methodology to Integrate Magnetic Resonance and Acoustic Measurements for Reservoir Characterization*, Annual Report, April 2000-April 2001, 111 pp.
PUB DATE 01/16/2002
CONTRACTOR Southwest Research Institute

The objective of this project was to develop an advanced imaging method, including pore scale imaging, to integrate NMR techniques and acoustic measurements to improve predictability of the pay zone in hydrocarbon reservoirs. This is accomplished by extracting the fluid property parameters using NMR laboratory measurements and the elastic parameters of the rock matrix from acoustic measurements to create poroelastic models of different parts of the reservoir. Laboratory measurement techniques and core imaging are being linked with a balanced petrographical analysis of the core and theoretical model.

PUB ID DOE/BC/15203-4 **ORDER #** 795220
TITLE *A Methodology to Integrate Magnetic Resonance and Acoustic Measurements for Reservoir Characterization*, Semi-Annual Report, April 1, 2000-October 31, 2000, 29 pp.
PUB DATE 06/01/2002
CONTRACTOR Southwest Research Institute

The objective of the project was to develop an advanced imaging method, including pore scale imaging, to integrate nuclear magnetic resonance (NMR) techniques and acoustic measurements to improve predictability of the pay zone in hydrocarbon reservoirs. This will be accomplished by extracting the fluid property parameters using NMR laboratory measurements and the elastic parameters of the rock matrix from acoustic measurements to create poroelastic models of different parts of the reservoir. Laboratory measurement techniques and core imaging were linked with a balanced petrographical analysis of cores and theoretical modeling.

PUB ID DOE/BC/15218-2 **ORDER #** 795667
TITLE *Risk Reduction with a Fuzzy Expert Exploration Tool*, Semi-Annual Report, March 15, 2001-March 15, 2002, 71 pp.
PUB DATE 06/27/2002
CONTRACTOR New Mexico Petroleum Recovery Research Center/NMIMT

In the first three years of the Fee Tool Project, an

immense amount of data on the Delaware Basin was accumulated. Data on geology, structure, production, regional information such as gravity as well as local data, such as well logs. This data, organized and cataloged into several online databases, is available for the Expert System and users as needed and as appropriate in analyzing production potential.

PUB ID DOE/BC/15309-1 **ORDER #** 792248
TITLE *Mapping of Reservoir Properties and Facies Through Integration of Static and Dynamic Data*, Annual Report, October 1, 2000-September 30, 2001, 97 pp.
PUB DATE 03/05/2002
CONTRACTOR The University of Tulsa

The goal of this project was to develop computationally efficient automatic history matching techniques for generating geologically plausible reservoir models which honor both static and dynamic data. Solution of this problem is necessary for the quantification of uncertainty in future reservoir performance predictions and for the optimization of reservoir management.

PUB ID DOE/BC/15310-1 **ORDER #** 795618
TITLE *Geo-Engineering through Internet Informatics (GEMINI)*, Annual Report, October 1, 2000-September 30, 2001, 39 pp.
PUB DATE 06/24/2002

CONTRACTOR The University of Kansas Center for Research, Inc.

GEMINI resolved reservoir parameters that controlled well performance; characterized subtle reservoir properties important in understanding and modeling hydrocarbon pore volume and fluid flow; expedited recognition of bypassed, subtle, and complex oil and gas reservoirs at regional and local scale; differentiated commingled reservoirs; built integrated geologic and engineering model based on real-time, iterative solutions to evaluate reservoir management options for improved recovery; provided practical tools to assist the geoscientist, engineer, and petroleum operator in making their tasks more efficient and effective; enabled evaluations to be made at different scales, ranging from individual well, through lease, field, to play and region (scalable information infrastructure); and provided training and technology transfer to evaluate capabilities of the client.

PUB ID DOE/SW/41271-1 **ORDER #** 793620

TITLE *Sequence Stratigraphy of the Dakota Sandstone, Eastern San Juan Basin, New Mexico, and its Relationship to Reservoir Compartmentalization*, Final Report, May 23, 2000, 429 pp.

PUB DATE 04/23/2002

CONTRACTOR Associated Western Universities

This research established the Dakota-outcrop sequence stratigraphy in part of the eastern San Juan Basin, New Mexico, and relates reservoir quality lithologies in depositional sequences to structure and reservoir compartmentalization in the South Lindrith Field area. The result was a predictive tool that will help guide further exploration and development.

**CATEGORY: DRILLING, COMPLETION,
AND STIMULATION**

PUB ID DOE/BC/14963-21 **ORDER #** 782224

TITLE *West Hackberry Tertiary Project, Class I*, Final Report, September 3, 1993-March 31, 1999, 29 pp.

PUB DATE 02/28/2002

CONTRACTOR Amoco Production Company

The West Hackberry Tertiary Project was a field test of the concept that air injection could generate tertiary oil recovery through the Double Displacement Process. The Double Displacement Process is the gas displacement of a water invaded oil column for the purpose of recovering tertiary oil through gravity drainage. The novel aspect of this project was the use of air as the injection fluid. In Gulf Coast oil reservoirs with pronounced bed dip, reservoir performance has shown that gravity drainage recoveries average 80% to 90% of the original oil in place while water drive recoveries average 50% to 60% of the original oil in place. The target for tertiary oil recovery with the Double Displacement Process was the incremental oil between the 50% to 60% water drive recoveries and the 80% to 90% gravity drainage recoveries.

PUB ID DOE/BC/14987-16 **ORDER #** 787973

TITLE *Improved Oil Recovery in Mississippian Carbonate Reservoirs of Kansas - Near-Term, Class II*, Final Report, September 16, 1994-April 30, 2001, 146 pp.

PUB DATE 10/17/2001

CONTRACTOR The University of Kansas Center for Research, Inc.

The focus of this project was development and demonstration of cost-effective reservoir description and man-

agement technologies to extend the economic life of mature reservoirs in Kansas and the mid-continent.

PUB ID DOE/BC/14990-23 **ORDER #** 784113

TITLE *Application of Reservoir Characterization and Advanced Technology to Improve Recovery and Economics in a Lower Quality Shallow Shelf Carbonate Reservoir, Class II*, Annual Report, August 3, 1997-August 2, 1998, 35 pp.

PUB DATE 08/06/2001

CONTRACTOR Oxy USA Inc.

The Oxy operated Class 2 Project at West Welch Project is designed to demonstrate how the use of advanced technology can improve the economics of miscible CO₂ injection projects in lower quality Shallow Shelf Carbonate reservoirs. The research and design phase (Budget Period 1) primarily involved advanced reservoir demonstration characterization. The current demonstration phase (Budget Period 2) is the implementation of the reservoir management plan for an optimum miscible CO₂ flood design based on the reservoir characterization.

PUB ID DOE/BC/15024-2 **ORDER #** 773002

TITLE *Design and Development of Gas-Liquid Cylindrical Cyclone Compact Separators for Three-Phase Flow*, Semi-Annual Report, April 1, 2000-September 30, 2000, 25 pp.

PUB DATE 01/10/2001

CONTRACTOR The University of Tulsa

The objective of this five-year project (October 1997 - September 2002) was to expand the current research activities of Tulsa University Separation Technology Projects (TUSTP) to multiphase oil/water/gas separation. This project was executed in two phases. Phase I (1997 - 2000) focused on the investigations of the complex multiphase hydrodynamic flow behavior in a three-phase Gas-Liquid Cylindrical Cyclone (GLCC) Separator.

PUB ID DOE/BC/15024-4 **ORDER #** 773336

TITLE *Design and Development of Gas-Liquid Cylindrical Cyclone Compact Separators for Three-Phase Flow*, Semi-Annual Report, October 1, 1998-March 31, 1999, 18 pp.

PUB DATE 01/18/2001

CONTRACTOR The University of Tulsa

The objective of this five-year project (October 1997 - September 2002) was to expand the current research activities of Tulsa University Separation Technology

Projects (TUSTP) to multiphase oil/water/gas separation. This project was executed in two phases. Phase I (1997 - 2000) focused on the investigations of the complex multiphase hydrodynamic flow behavior in a three-phase Gas-Liquid Cylindrical Cyclone (GLCC) Separator. The activities of this phase included the development of a mechanistic model, a computational fluid dynamics (CFD) simulator, and detailed experimentation on the three-phase GLCC.

PUB ID DOE/BC/15119-1 **ORDER #** 789030

TITLE *Quantitative Methods for Reservoir Characterization and Improved Recovery: Application to Heavy Oil Sands*, Annual Report, October 1, 1998-September 30, 1999, 22 pp.

PUB DATE 11/29/2001

CONTRACTOR Clemson University

The first twelve months of the project focused on collecting data for characterization and modeling. In addition, data from Coalinga Field was analyzed to define the fractal structure present in the data set. The following sections of the report parallel the first four subtasks of the investigation: (1) collect and Load Property Data from Temblor Outcrops in California, (2) Collect and Load Property Data from Temblor Reservoir Sands, West Coalinga Field, California, (3) Collect and Load Property Data from Continuous Upper Cretaceous Outcrops in Utah, and (4) Define Fractal Structure in the Data Sets and Apply to Generating Property Representations.

PUB ID DOE/BC/15128-1 **ORDER #** 777920

TITLE *Heterogeneous Shallow-Shelf Carbonate Buildups in the Paradox Basin, Utah and Colorado: Targets for Increased Oil Production and Reserves Using Horizontal Drilling Techniques*, Semi-Annual Report, April 6-September 5, 2000, 22 pp.

PUB DATE 04/19/2001

CONTRACTOR Utah Geological Survey

The primary objective of this project was to enhance domestic petroleum production by demonstration and transfer of horizontal drilling technology in the Paradox basin, Utah, Colorado, Arizona, and New Mexico. If this project can demonstrate technical and economic feasibility, then the technique can be applied to approximately 100 additional small fields in the Paradox basin alone, and result in increased recovery of 25 to 50 million barrels of oil. This project was designed to characterize several shallow-shelf carbonate reservoirs in the Pennsylvania (Desmoinesian) Paradox Formation, choose the best can-

didate(s) for a pilot demonstration project to drill horizontally from existing vertical wells, monitor well performance(s).

PUB ID DOE/BC/15128-2 **ORDER #** 788886

TITLE *Heterogeneous Shallow-Shelf Carbonate Buildups in the Paradox Basin, Utah and Colorado: Targets for Increased Oil Production and Reserves Using Horizontal Drilling Techniques*, Semi-Annual Report, September 6, 2000-April 5, 2001, 24 pp.

PUB DATE 11/26/2001

CONTRACTOR Utah Geological Survey

The project's primary objective was to enhance domestic petroleum production by demonstration and transfer of horizontal drilling technology in the Paradox Basin, Utah, Colorado, Arizona, and New Mexico. If this project can demonstrate technical and economic feasibility, then the technique can be applied to approximately 100 additional small fields in the Paradox Basin alone, and result in increased recovery of 25 to 50 million barrels of oil. This project was designed to characterize several shallow-shelf carbonate reservoirs in the Pennsylvanian (Desmoinesian) Paradox Formation, choose the best candidate(s) for a pilot demonstration project to drill horizontally from existing vertical wells, monitor well performance(s).

PUB ID DOE/BC/15213-3 **ORDER #** 784657

TITLE *Advanced Techniques for Reservoir Simulation and Modeling of Non-Conventional Wells*, Annual Report, September 1, 2000-August 31, 2001, 145 pp.

PUB DATE 08/23/2001

CONTRACTOR Stanford University

Research results for the second year of this project on the development of improved modeling techniques for non-conventional (e.g., horizontal, deviated or multilateral) wells were presented. The overall program entails the development of enhanced well modeling and general simulation capabilities. A general formulation for black-oil and compositional reservoir simulation was presented.

CATEGORY: ENVIRONMENTAL, SAFETY AND HEALTH

PUB ID DOE/BC/14849-3 Vol.1of4 **ORDER #** 774789

TITLE *Restored Drill Cuttings for Wetlands Creation: Year One Results of a Mesocosm Approach to Emulate Field Conditions Under Varying Hydrologic Regimes*, Topical Report, December 1996, 41 pp.

PUB DATE 02/13/2001

CONTRACTOR Pioneer Natural Resources

The purpose of this study was to demonstrate that restored drill cuttings, a byproduct of the petroleum industry, can be safely used in coastal as well as inland wetland restoration projects. Prior to conducting laboratory experiments, composite soil samples of the recycled sediments were analyzed for pH and heavy metal concentrations.

PUB ID DOE/BC/14849-3 Vol.3of4 **ORDER #** 774790

TITLE *Restored Drill Cuttings for Wetlands Creation: Results of Mesocosm Approach to Emulate Field Conditions Under Varying Salinity and Hydrologic Conditions*, Topical Report, April 2000, 86 pp.

PUB DATE 02/13/2001

CONTRACTOR Pioneer Natural Resources

This study builds upon earlier research conducted by Southeastern Louisiana University concerning the efficacy of utilizing processed drill cuttings as an alternative substrate source for wetland rehabilitation (wetland creation and restoration). Previous research has indicated that processed drill cuttings exhibit a low degree of contaminant migration from the process drill cuttings to interstitial water and low toxicity, as tested by seven-day mysid shrimp chronic toxicity trials.

PUB ID DOE/BC/14849-6 **ORDER #** 795077

TITLE *Restored Drill Cuttings for Wetlands Creation: Results of Mesocosm Approach to Emulate Field Conditions Under Varying Salinity and Hydrologic Conditions*, Final Report, January 27, 1997-January 26, 2000, 93 pp.

PUB DATE 06/03/2002

CONTRACTOR Pioneer Natural Resources

Both interstitial water and plant tissue associated with the DC-A substrate exhibited low metal concentrations were observed. Also in agreement with the previous study, plant performance in the DC-A substrate was found to be comparable to plant performance in the dredge spoil and topsoil substrates. This was extremely important because it indicated that the drill cuttings themselves served as an excellent substrate for wetland plant growth, but that the processing and stabilization techniques and drilling fluid formulations required further refinement.

PUB ID DOE/BC/15141-1 **ORDER #** 794997

TITLE *Assistance to Oil and Gas State Agencies and Industry through Continuation of Environmental and Production*

Data Management and a Water Regulatory Initiative, Final Report, October 1, 1998-September 30, 2001, 337 pp.

PUB DATE 05/29/2002

CONTRACTOR Ground Water Protection Research Foundation

The Risk Based Data Management System (RBDMS) project addresses the needs identified during the projects initial phases: (1) State regulatory agencies implemented more formalized environmental risk management practices as they pertain to the production of oil and gas, and injection via Class II wells. (2) Enhancement of oil and gas production by implementing a management system supporting the saving of abandoned or idle wells located in areas with a relatively low environmental risk of endangering underground sources of drinking water (USDWs) in a particular state. (3) Verification that protection of USDWs is adequate and additional restrictions of requirements are not necessary in areas with a relatively low environmental risk. (4) Standardization of data and information maintained by state regulatory agencies and decrease the regulatory cost burden on producers operating in multiple states, and (5) Development of a system for electronic data transfer among operators and state regulatory agencies and reduction of overall operator reporting burdens.

PUB ID DOE/BC/15183-1 **ORDER #** 792804

TITLE *Electronic Compliance and Approval Project (ECAP)*, Annual Report, July 15, 2000-July 14, 2001, 44 pp.

PUB DATE 03/14/2001

CONTRACTOR Railroad Commission of Texas

The Texas Railroad Commission (RRC), working in partnership with the United States Department of Energy and the oil and gas industry it regulates, implemented a strategy for improving efficiency in regulations and significantly reducing administrative operating costs through the Electronic Compliance and Approval Process (ECAP). This project streamlined regulatory compliance and reporting by providing the ability to electronically submit, process, and query oil and gas applications and reports through the Internet-based ECAP system.

PUB ID DOE/BC/15222-3 **ORDER #** 789566

TITLE *Development of Improved Oil Field Waste Injection Disposal Techniques*, Annual Report, September 30, 2001, 19 pp.

PUB DATE 12/17/2001

CONTRACTOR Terralog Technologies USA, Inc.

The goals of this DOE-sponsored project are to: (1) assemble and analyze a comprehensive database of past waste injection operations; (2) develop improved diagnostic techniques for monitoring fracture growth and formation changes; (3) develop operating guidelines to optimize daily operations and ultimate storage capacity of the target formation; and (4) to test these improved models and guidelines in the field.

PUB ID DOE/BC/15225-1 **ORDER #** 792803

TITLE *Soil Remediation Requirements Related to Abandoned Centralized and Commercial Drilling-Fluid Disposal Sites in Louisiana, New Mexico, Oklahoma, and Texas*, Semi-Annual Report, August 25, 2000-February 24, 2001, 34 pp.

PUB DATE 03/14/2002

CONTRACTOR The University of Texas at Austin

This study was a compilation and summary of information on active and inactive centralized or commercial drilling-fluid disposal sites in Louisiana, New Mexico, Oklahoma, and Texas. The objective of the analysis of these sites was to gain insight into the probable behavior of contaminants at poorly documented abandoned drilling fluid disposal sites. Available information being reported in this study includes number and acreage of pits, delivered waste volumes, and levels of selected constituents in the solid waste, in the water overlying the solids, and groundwater monitored at on-site wells. For many sites, dated constituent analyses for specific monitor wells are available for time-series mapping and graphing of variable concentrations.

PUB ID DOE/BC/W-31-109-ENG-38-10
ORDER # 781351

TITLE *A Study of the Effects of Gas Well Compressor Noise on Breeding Bird Populations of the Rattlesnake Canyon Habitat Management Area, San Juan County, New Mexico*, Final Report, May 2001, 90 pp.

PUB DATE 06/04/2001

CONTRACTOR Argonne National Laboratory

This report, conducted from May through July 2000, addressed the potential effect of compressor noise on breeding birds in gas-production areas administered by the FFO, specifically in the Rattlesnake Canyon Habitat Management Area northeast of Farmington, New Mexico. The study was designed to quantify and characterize noise output from these compressors and to determine if compressor noise affected bird populations in adjacent

habitat during the breeding season.

PUB ID DOE/FEW 8242-1 **ORDER #** 774489

TITLE *Multiphase Flow and Cavern Abandonment in Salt*, Final Report, October 2000, 12 pp.

PUB DATE 02/13/2001

CONTRACTOR Sandia National Laboratory

This report explores the hypothesis that an underground cavity in gassy salt will eventually be gas filled as is observed on a small scale in some naturally occurring salt inclusions. First, a summary was presented on what is known about gas occurrences, flow mechanisms, and cavern behavior after abandonment. Then, background information was synthesized into theory on how gas can fill a cavern and simultaneously displace cavern fluids into the surrounding salt. Lastly, two-phase (gas and brine) flow visualization experiments are presented that demonstrate some of the associated flow mechanisms and support the theory and hypothesis that a cavity in salt can become gas filled after plugging and abandonment.

PUB ID DOE/MT/94002-11 **ORDER #** 777918

TITLE *Application of an Area-of-Review (AOR) Concept to the East Texas Field and Other Selected Texas Oilfields*, Final Report, May 16, 1994-May 15, 1998, 402 pp.

PUB DATE 04/18/2001

CONTRACTOR University of Missouri-Rolla

The Underground Injection Control Regulations promulgated in 1980, under the Safe Drinking Water Act of 1974, require Area-of-Review (AOR) studies be conducted as part of the permitting process for newly drilled or converted Class II injection wells. Existing Class II injection wells operating at the time regulations became effective were excluded from the AOR requirement. The AOR is the area surrounding an injection well or wells defined by either the radial distance within which pressure in the injection zone may cause migration of the injection and/or formation fluid into an underground source of drinking water (USDW) or defined by a fixed radius of not less than one-fourth mile. In the method where injection pressure is used to define the AOR radial distance, the AOR is also known as the "zone of endangering influence."

PUB ID DOE/MT/94006-11 **ORDER #** 792683

TITLE *A Guidance Document for Kentucky's Oil and Gas Operators*, Final Report, July 1, 1999-July 30, 1999, 811 pp.

PUB DATE 03/14/2002

CONTRACTOR Kentucky Division of Oil and Gas

The accompanying report, manual and assimilated data represent the initial preparation for submission of an Application for Primacy under the Class II Underground Injection Control (UIC) program on behalf of the Commonwealth of Kentucky. The purpose of this study was to identify deficiencies in Kentucky law and regulation that would prevent the Kentucky Division of Oil and Gas from receiving approval of primacy of the UIC program, currently under control of the United States Environmental Protection Agency (EPA) in Atlanta, Georgia.

PUB ID DOE/MT/95003-14 **ORDER #** 795421

TITLE *Development of a Data Management System for Assistance in Conducting Area of Reviews (AORS) on Class II Injection Wells in Oklahoma*, Final Report, June 19, 2001, 5 pp.

PUB DATE 06/13/2002

CONTRACTOR Oklahoma Corporation Commission

The purpose of this project was to provide the resources and capabilities necessary to permit the State of Oklahoma to conduct Area of Review (AOR) variance analysis on a statewide level. The project allows for the analysis and identification of areas which may qualify for AOR variances, the correlation of information from various databases and automated systems to conduct AORs in area which do not qualify for variances, the evaluation of the risk of pollution, during permitting and monitoring, using risk-based data analysis, and the ability to conduct spatial analysis of injection well data in conjunction with other geographically referenced information.

PUB ID DOE/NT/40833-11 **ORDER #** 792802

TITLE *Synthesis of Mesoporous Aluminophosphates as Potential Catalysts in the Upgrading Petroleum Feedstocks*, Annual Report, September 1, 2000-August 31, 2001, 19 pp.

PUB DATE 03/14/2002

CONTRACTOR Clark Atlanta University

This project focuses on the synthesis of mesoporous aluminophosphate (AIPO) catalysts for application in the acid catalyzed conversion of large petroleum feedstock compounds to useful middle distillates and naphtha transportation fuels.

PUB ID DOE/SW/45043-1 **ORDER #** 774579

TITLE *Lease Operations Environmental Guidance Document*, Final Report, September 2000, 170 pp.

PUB DATE 02/14/2001

CONTRACTOR Bureau of Land Management

This report contains discussions in nine different areas as follows: (1) Good Lease Operating Practices; (2) Site Assessment and Sampling; (3) Spills/Accidents; (4) Containment and Disposal of Produced Waters; (5) Restoration of Hydrocarbon Impacted Soils; (6) Restoration of Salt Impacted Soils; (7) Pit Closures; (8) Identification, Removal and Disposal of Naturally Occurring Radioactive Materials (NORM); and (9) Site Closure and Construction Methods for Abandonment Wells/Locations. This report is primary directed towards the operation of oil and gas producing wells.

PUB ID FEW 3692-2 **ORDER #** 777919

TITLE *An Investigation of the Integrity of Cemented Casing Seals with Application to Salt Cavern Sealing and Abandonment*, Final Report, October 2000, 100 pp.

PUB DATE 02/14/2001

CONTRACTOR Sandia National Laboratory/RESPEC/Terralog Technologies

This research project was pursued in three key areas. (1) Salt permeability testing under complex stress states; (2) Hydraulic and mechanical integrity investigations of the well casing shoe through benchscale testing; and (3) Geomechanical modeling of the fluid/salt hydraulic and mechanical interaction of a sealed cavern.

CATEGORY: FIELD DEMONSTRATION

PUB ID DOE/BC/14934-13 **ORDER #** 784131

TITLE *Increasing Waterflooding Reservoirs in the Wilmington Oil Field through Improved Reservoir Characterization and Reservoir Management, Class III*, Annual Report, March 21, 2000-March 20, 2001, 90 pp.

PUB DATE 08/06/2001

CONTRACTOR City of Long Beach

This project was intended to increase recoverable water-flood reserves in slope and basin reservoirs through improved reservoir characterization and reservoir management. The particular application of this project is in portions of Fault Blocks IV and V of the Wilmington Oil Field in Long Beach, California, but the approach is widely applicable in slope and basin reservoirs, transferring

technology so that it can be applied in other sections of the Wilmington field and by operators in other slope and basin reservoirs is a primary component of the project.

PUB ID DOE/BC/14935-9 **ORDER #** 776910

TITLE *Feasibility of Optimizing Recovery & Reserves from a Mature & Geological Complex Multiple Turbidite Offshore Calif. Reservoir through the Drilling & Completion of a Trilateral Horizontal Well, Class III*, Final Report, January 15, 2001, 48 pp.

PUB DATE 04/02/2001

CONTRACTOR Pacific Operators Offshore, Inc.

The intent of this project was to increase production and extend the economic life of this mature field through the application of advanced reservoir characterization and drilling technology, demonstrating the efficacy of these technologies to other small operators of aging fields. The initial study period showed that a single tri-lateral well would not be economically efficient in redevelopment of Carpinteria's multiple deep water turbidite sand reservoirs, and the study was amended to include the drilling of a series of horizontal redrills from existing surplus well bores on Pacific Operators' Platform Hogan.

PUB ID DOE/BC/14960-19 Vol.1 **ORDER #** 791330

TITLE *Post Waterflood CO₂ Miscible Flood in Light Oil, Fluvial-Dominated Deltaic Reservoir, Class I*, Final Report, June 1, 1993-December 31, 1994, 243 pp.

PUB DATE 02/05/2002

CONTRACTOR Texaco Exploration and Production, Inc.

This report demonstrates the effectiveness of the CO₂ miscible process in Fluvial Dominated Deltaic reservoirs. It also evaluated the use of horizontal CO₂ injection wells to improve the overall sweep efficiency. A database of FDD reservoirs for the gulf coast region was developed by LSU, using a screening model developed by Texaco Research Center in Houston. The results of the information gained in this project is disseminated throughout the oil industry via a series of SPE papers and industry open forums.

PUB ID DOE/BC/14960-19 Vol.2 **ORDER #** 791331

TITLE *Post Waterflood CO₂ Miscible Flood in Light Oil, Fluvial-Dominated Deltaic Reservoir, Class I*, Final Report, June 1, 1995-December 31, 1997, 371 pp.

PUB DATE 01/16/2002

CONTRACTOR Texaco Exploration and Production, Inc.

This report demonstrates the effectiveness of the CO₂ miscible process in Fluvial Dominated Deltaic reservoirs. It also evaluated the use of horizontal CO₂ injection wells to improve the overall sweep efficiency. A database of FDD reservoirs for the gulf coast region was developed by LSU, using a screening model developed by Texaco Research Center in Houston. The results of the information gained in this project is disseminated throughout the oil industry via a series of SPE papers and industry open forums.

PUB ID DOE/BC/14960-19 Vol.3 **ORDER #** 791332

TITLE *Post Waterflood CO₂ Miscible Flood in Light Oil, Fluvial-Dominated Deltaic Reservoir (Pre-Work and Project Proposal), Class I*, Final Report, June 1, 1993-December 31, 1997, 108 pp.

PUB DATE 01/16/2002

CONTRACTOR Texaco Exploration and Production, Inc.

This project outlines a proposal to improve the recovery of light oil from waterflooded fluvial dominated deltaic (FDD) reservoir through a miscible carbon dioxide (CO₂) flood. The site is the Port Neches Field in Orange County, Texas. The field is well explored and well exploited. The project area is 270 acres within the Port Neches Field.

PUB ID DOE/BC/14960-19 Vol.4 **ORDER #** 791333

TITLE *Post Waterflood CO₂ Miscible Flood in Light Oil, Fluvial-Dominated Deltaic Reservoir (Pre-Work and Project Proposal-Appendix), Class I*, Final Report, June 1, 1993-December 31, 1997, 344 pp.

PUB DATE 01/16/2002

CONTRACTOR Texaco Exploration and Production, Inc.

The main objective of the Port Neches Project was to determine the feasibility and producibility of CO₂ miscible flooding techniques enhanced with horizontal drilling applied to a Fluvial Dominated Deltaic reservoir. The second was to disseminate the knowledge gained through established Technology Transfer mechanisms to support DOE's programmatic objectives of increasing domestic oil production and reducing abandonment of oil fields.

PUB ID DOE/BC/15248-1 **ORDER #** 789609

TITLE *Using Flue Gas Huff 'n Puff Technology and Surfactants to Increase Oil Production from the Antelope*

Shale Formation of the Railroad Gap Oil Field, Final Report, October 10, 1999-July 1, 2001, 55 pp.

PUB DATE 12/18/2001

CONTRACTOR Naftex Operating Company

This project was designed to test cyclic injection of exhaust flue gas from compressors located in the field to stimulate production from Antelope Shale zone producers. Approximately 17,000 m³ (\pm 600 MCF) of flue gas was to be injected into each of three wells over a three-week period, followed by close monitoring of production for response. Flue gas injection on one of the wells would be supplemented with a surfactant.

CATEGORY: HEAVY OIL

PUB ID DOE/FT/40147-1 **ORDER #** 789624

TITLE *Transport and Phase Equilibria Properties for Steam Flooding of Heavy Oils*, Annual Report, October 1998-September 1999, 28 pp.

PUB DATE 12/18/2001

CONTRACTOR Prairie View A&M State University

The objectives of this research included experimental determination and rigorous modeling and computation of phase equilibria, volumetric, and transport properties of hydrocarbon/CO₂/water mixtures at pressures and temperatures typical of steam injection processes for thermal recovery of heavy oils.

PUB ID DOE/FT/40615-1 **ORDER #** 792491

TITLE *Experimental and Theoretical Determination of Heavy Oil Viscosity Under Reservoir Conditions*, Annual Report, October 1999-September 2000, 32 pp.

PUB DATE 03/11/2002

CONTRACTOR Prairie View A&M State University

The main objective of this research was to propose a simple procedure to predict heavy oil viscosity at reservoir conditions as a function of easily determined physical properties. This procedure will avoid costly experimental testing and reduce uncertainty in designing thermal recovery processes.

CATEGORY: OIL FIELD PRODUCTION AND OPERATION

PUB ID DOE/BC/14851-4 **ORDER #** 776387

TITLE *Prediction of Gas Injection Performance for Heterogeneous Reservoirs*, Final Report, June 2000, 207 pp.

PUB DATE 03/27/2001

CONTRACTOR Stanford University

This report was an integrated study of the physics and chemistry affecting gas injection, from the pore scale to the field scale, and involved theoretical analysis, laboratory experiments and numerical simulation. Specifically, advances were made on streamline-based simulation, analytical solutions to 1D compositional displacements, and modeling and experimental measures of three-phase flow.

PUB ID DOE/BC/14936-17 **ORDER #** 780435

TITLE *Application of Advanced Reservoir Characterization, Simulation, and Production Optimization Strategies to Maximize Recovery in Slope and Basin Clastic Reservoirs, West Texas (Delaware Basin), Class III*, Annual Report, March 31, 2000-March 30, 2001, 72 pp.

PUB DATE 05/01/2001

CONTRACTOR The University of Texas at Austin

The objective was to demonstrate that detailed reservoir characterization of slope and basin clastic reservoirs in sandstone's of the Delaware Mountain Group in the Delaware Basin of West Texas and New Mexico is a cost effective way to recover a higher percentage of the original oil in place through strategic placement of infill wells and geologically based field development. Project objectives are divided into two main phases. The original objectives of the reservoir-characterization phase of the project were (1) to provide a detailed understanding of the architecture and heterogeneity of two representative fields of the Delaware Mountain Group, Geraldine Ford and Ford West, which produce from the Bell Canyon and Cherry Canyon Formations, respectively, (2) to chose a demonstration area in one of the fields, and (3) to simulate a CO₂ flood in the demonstration area.

PUB ID DOE/BC/14936-18 **ORDER #** 789251

TITLE *Application of Advanced Reservoir Characterization, Simulation, and Production Optimization Strategies to Maximize Recovery in Slope and Basin Clastic Reservoirs, West Texas (Delaware Basin), Class III*, Final Report, March 31, 1995-August 31, 2001, 166 pp.

PUB DATE 11/04/2001

CONTRACTOR The University of Texas at Austin

The objective was to demonstrate that reservoir characterization and enhanced oil recovery (EOR) by CO₂ flood can increase production from slope and basin clastic reservoirs in sandstones of the Delaware Mountain Group in the Delaware Basin of West Texas and New Mexico. Phase 1 of the project, reservoir characterization, focused on Geraldine Ford and East Ford fields, which are Delaware Mountain Group fields that produce from the upper Bell Canyon Formation (Ramsey sandstone). The demonstration phase of the project was a CO₂ flood conducted in East Ford field, which is operated by Orla Petco, Inc., as the East Ford unit.

PUB ID DOE/BC/14937-12 **ORDER #** 772932

TITLE *Reactivation of an Idle Lease to Increase Heavy Oil Recovery through Application of Conventional Steam Drive Technology in a Low-Dip Slope & Reservoir in the Midway-Sunset Field, San Joaquin Basin, California, Class III, Annual Report, June 13, 1999-June 12, 2000, 42 pp.*

PUB DATE 01/09/2001

CONTRACTOR University of Utah

The objective of this project is not just to produce oil from the Pru Fee property, but rather to test which operational strategies best optimize total oil recovery at economically acceptable rates of production and production costs.

PUB ID DOE/BC/14937-13 **ORDER #** 791735

TITLE *Reactivation of an Idle Lease to Increase Heavy Oil Recovery through Application of Conventional Steam Drive Technology in a Low-Dip Slope & Reservoir in the Midway-Sunset Field, San Joaquin Basin, California, Class III, Final Report, June 14, 1995-March 13, 2001, 146 pp.*

PUB DATE 02/21/2002

CONTRACTOR University of Utah

The objective of the project is not just to commercially produce oil from the Pru Fee property, but rather to test which operational strategies best optimize total oil recovery at economically acceptable rates of production volumes and costs.

PUB ID DOE/BC/14996-5 **ORDER #** 794100

TITLE *Greybull Sandstone Petroleum Potential on the*

Crow Indian Reservation, South-Central Montana, Final Report, October 1, 2000-December 12, 2000, 109 pp.

PUB DATE 05/09/2002

CONTRACTOR Montana Bureau of Mines and Geology

The focus of this project was to explore for stratigraphic traps that may be present in valley-fill sandstone at the top of the Lower Cretaceous Kootenai Formation. This sandstone interval, generally known as the Greybull Sandstone, has been identified along the western edge of the reservation and is a known oil and gas reservoir in the surrounding region. The Greybull Sandstone was chosen as the focus of this research because it is an excellent, well-documented, productive reservoir in adjacent areas, such as Elk Basin; Mosser Dome field, a few miles northwest of the reservation; and several other oil and gas fields in the northern portion of the Bighorn Basin.

PUB ID DOE/BC/15026-1 **ORDER #** 756282

TITLE *Location, Reprocessing, and Analysis of Two Dimensional Seismic Reflection Data on the Jicarilla Apache Indian Reservation, New Mexico, Final Report, September 1, 1997-February 1, 2000, 52 pp.*

PUB DATE 04/23/2001

CONTRACTOR U.S. Geological Survey

Exploration for oil and gas by both large and small companies has taken place in northern part of the San Juan Basin in New Mexico, including the Jicarilla Apache reservation, for many years. As part of their exploration efforts various companies acquired a significant amount of a two-dimensional multichannel seismic reflection data on both regional and prospect scales. The primary purpose of this study was to locate and collect as much of this seismic data as possible, bringing it into a central location where it could be evaluated, reprocessed, and interpreted. The interpretation provides additional subsurface structural information valuable in support of traditional geologic mapping using well log data.

PUB ID DOE/BC/15026-2 **ORDER #** 778489

TITLE *Outcrop Analysis of the Cretaceous Mesaverde Group: Jicarilla Apache Reservation, New Mexico, Final Report, January 22, 1998-June 30, 1999, 131 pp.*

PUB DATE 04/23/2001

CONTRACTOR U.S. Geological Survey

Field work for this project was conducted during July and April 1998. Fourteen measured sections were described and correlated on or adjacent to the Jicarilla Apache

Reservation lands. A fifteenth section, described east of the main field area, is included in this report, although its distant location precluded use in the correlations and cross sections presented herein. Ground-based photo mosaics were shot for much of the exposed Mesaverde outcrop belt and were used to assist in correlation. Outcrop gamma-ray surveys at six of the fifteen measured sections using a GAD-6 scintillometer was conducted. The raw gamma-ray data are included in this report, however, analysis of those data is part of the ongoing Phase Two of this project.

PUB ID DOE/BC/15026-3 **ORDER #** 778870

TITLE *Outcrop Gamma-ray Analysis of the Cretaceous mesaverde Group: Jicarilla Apache Indian Reservation, New Mexico*, Final Report, January 22, 1998-March 31, 2000, 68 pp.

PUB DATE 04/23/2001

CONTRACTOR U.S. Geological Survey

This report presents the results of an outcrop gamma-ray survey of six selected measured sections included in the original report. The primary objective of this second study is to provide a baseline to correlate from the outcrop and reservoir model into Mesaverde strata in the San Juan Basin subsurface. Outcrop logs were generated using a GAD-6 gamma-ray spectrometer that simultaneously recorded total counts, potassium, uranium, and thorium data.

PUB ID DOE/BC/15026-4 **ORDER #** 784573

TITLE *Sequence Stratigraphic Analysis and Facies Architecture of the Cretaceous Mancos Shale on and Near the Jicarilla Apache Indian Reservation*, Final Report, January 22, 1998-March 31, 2000, 101 pp.

PUB DATE 08/21/2001

CONTRACTOR U.S. Geological Survey

The focus of this report centers on (1) redefinition of the area and vertical extent of the "Gallup sandstone" or El Vado Sandstone Member of the Mancos Shale, (2) determination of the facies distribution within the "Gallup sandstone" and other oil-producing sandstones within the lower Mancos, placing these facies within the overall depositional history of the San Juan Basin, (3) application of the principals of sequence stratigraphy to the depositional units that comprise the Mancos Shale, and (4) evaluation of the structural features on the Reservation as they may control sites of oil accumulation.

PUB ID DOE/BC/15026-5 **ORDER #** 784576

TITLE *Subsurface Analysis of the Mesaverde Group on and near the Jicarilla Apache Indian Reservation, New Mexico-Its Implication on Sites of Oil and Gas Accumulation*, Final Report, January 22, 1998-March 31, 2000, 47 pp.

PUB DATE 08/21/2001

CONTRACTOR U.S. Geological Survey

The focus of this report centers on (1) integration of subsurface correlations with outcrop correlations of components of the Mesaverde, (2) application of the sequence stratigraphic model determined in the phase one study to these correlations, (3) determination of the facies distribution of the Mesaverde Group and their relationship to sites of oil and gas accumulation, (4) evaluation of the thermal maturity and potential source rocks for oil and gas in the Mesaverde Group, and (5) evaluation of the structural features on the Reservation as they may control sites of oil accumulation.

PUB ID DOE/BC/15047-5 **ORDER #** 776908

TITLE *Improved Efficiency of Miscible CO₂ Floods and Enhanced Prospects for CO₂ Flooding Heterogeneous Reservoirs*, Final Report, June 1, 1997-September 30, 2000, 191 pp.

PUB DATE 04/02/2001

CONTRACTOR New Mexico Institute of Mining & Technology

This report continues the progress on understanding CO₂ flooding in heterogeneous reservoirs, further the development of methods to enable CO₂ flooding in more heterogeneous reservoirs, and continue the dissemination of this information to promote successful implementation of these methods. The research covers three related areas: (1) Fluid and matrix interactions (understanding the problems), (2) Conformation control/sweep efficiency (solving the problems), and (3) Reservoir simulation for improved oil recovery (predicting results). All areas originate from research on the mechanics of oil recovery by high-pressure CO₂. Experience gained during the current project is relevant to our continued efforts.

PUB ID DOE/BC/15102-1 **ORDER #** 772926

TITLE *The Influence of Fold and Fracture Development on Reservoir Behavior of the Lisburne Group of Northern Alaska*, Semi-Annual Report, May-October 1999, 81 pp.

PUB DATE 01/09/2001

CONTRACTOR University of Alaska-Geophysical Institute

The objectives of this study were to develop a better understanding of four major aspects of the Lisburne: (1) The geometry and kinematics of detachment folds and their truncation by thrust faults, (2) The influence of folding and lithostratigraphy on fracture patterns, (3) Lithostratigraphy and its influence on folding, faulting, fracturing, and reservoir characteristics, and (4) The influence of lithostratigraphy and deformation on fluid flow.

PUB ID DOE/BC/15102-2 **ORDER #** 775022

TITLE *The Influence of Fold and Fracture Development on Reservoir Behavior of the Lisburne Group of Northern Alaska*, Annual Report, May 1999-May 2000, 300 pp.

PUB DATE 02/27/2001

CONTRACTOR University of Alaska-Geophysical Institute

The objectives of this study were to develop a better understanding of four major aspects of the Lisburne: (1) The geometry and kinematics of detachment folds and their truncation by thrust faults, (2) The influence of folding and lithostratigraphy on fracture patterns, (3) Lithostratigraphy and its influence on folding, faulting, fracturing, and reservoir characteristics, and (4) The influence of lithostratigraphy and deformation on fluid flow.

PUB ID DOE/BC/15102-3 **ORDER #** 783119

TITLE *The Influence of Fold and Fracture Development on Reservoir Behavior of the Lisburne Group of Northern Alaska*, Semi-Annual Report, May 2000-January 2001, 150 pp.

PUB DATE 07/16/2001

CONTRACTOR University of Alaska-Geophysical Institute

The Carboniferous Lisburne Group is a major carbonate reservoir unit in northern Alaska. The Lisburne is detachment folded where it is exposed throughout the north-eastern Brooks Range, but is relatively underformed in areas of current production in the subsurface of the North Slope. The objectives of this study are to develop a better understanding of four major aspects of the Lisburne: 1) the geometry and kinematics of detachment folds and their truncation by thrust faults, 2) the influence of folding on fracture patterns, 3) the influence of deformation on fluid flow, and 4) lithostratigraphy and its influence on folding, faulting, fracturing, and reservoir characteristics.

PUB ID DOE/BC/15107-1 **ORDER #** 773160

TITLE *Enhancing the Effectiveness of Carbon Dioxide Flooding by Managing Asphaltene Precipitation*, Annual Report, September 10, 1999-September 30, 2000, 86 pp.

PUB DATE 01/12/2001

CONTRACTOR University of Utah

The objective of this project were to identify conditions at which carbon dioxide induced precipitation occurred in crude oils. Establishing compositions of the relevant liquid and solid phases was planned. Other goals of the project were to determine if precipitation occurred in cores and to implement thermodynamic and compositional models to examine the phenomenon. Exploring kinetics of precipitation was also one of the project goals. Crude oil from the Rangely Field (eastern Colorado) was used as a prototype.

PUB ID DOE/BC/15107-3 **ORDER #** 791834

TITLE *Enhancing the Effectiveness of Carbon Dioxide Flooding by Managing Asphaltene Precipitation*, Annual Report, September 10, 2000-September 30, 2001, 15 pp.

PUB DATE 02/21/2002

CONTRACTOR University of Utah

Objectives of this project was to understand asphaltene precipitation in general and carbon dioxide induced precipitation in particular. To this effect, thermodynamic and kinetic experiments with the Rangely crude oil were conducted and thermodynamic and reservoir models were developed.

PUB ID DOE/BC/15107-4 **ORDER #** 791835

TITLE *Enhancing the Effectiveness of Carbon Dioxide Flooding by Managing Asphaltene Precipitation*, Final Report, September 10, 1998-December 31, 2001, 124 pp.

PUB DATE 02/21/2002

CONTRACTOR University of Utah

This project was undertaken to understand fundamental aspects of carbon dioxide (CO₂) induced asphaltene precipitation. Oil and asphaltene samples from the Rangely field in Colorado were used for most of the project. The project consisted of pure component and high-pressure, thermodynamic experiments, thermodynamic modeling, kinetic experiments and modeling, targeted corefloods and compositional modeling.

PUB ID DOE/BC/15108-6 **ORDER #** 790184
TITLE *Novel CO₂-Thickeners for Improved Mobility Control*, Final Report, October 1, 1998-September 30, 2001, 151 pp.

PUB DATE 01/15/2002

CONTRACTOR University of Pittsburg

The objective of this contract was to design, synthesize, and characterize thickening agents for dense carbon dioxide and to evaluate their solubility and viscosity-enhancing potential in CO₂.

PUB ID DOE/BC/15110-6 **ORDER #** 786057
TITLE *Using Chemicals to Optimize Conformance Control in Fractured Reservoirs*, Annual Report, October 1, 2000-September 30, 2001, 64 pp.

PUB DATE 09/07/2002

CONTRACTOR New Mexico Petroleum Recovery Research Center

The objectives of this project are: (1) to develop a capability to predict and optimize the ability of gels to reduce permeability to water more than that to oil or gas, (2) to develop procedures for optimizing blocking agent placement in wells where hydraulic fractures cause channeling problems, and (3) to develop procedures to optimize blocking agent placement in naturally fractured reservoirs. Work was directed at both injection wells and production wells and at vertical, horizontal, and highly deviated wells.

PUB ID DOE/BC/15110-7 **ORDER #** 787945
TITLE *Using Chemicals to Optimize Conformance Control in Fractured Reservoirs*, Final Report, October 1, 1998-September 30, 2001, 81 pp.

PUB DATE 10/29/2001

CONTRACTOR New Mexico Petroleum Recovery Research Center

This report describes work performed during the third and final year of the project, *Using Chemicals to Optimize Conformance Control in Fractured Reservoirs*. This research project had three objectives. The first objective was to develop a capability to predict and optimize the ability of gels to reduce permeability to water more than that to oil or gas. The second objective was to develop procedures for optimizing blocking agent placement in wells where hydraulic fractures cause channeling problems. The third objective was to develop procedures to optimize blocking agent placement in naturally fractured reservoirs.

PUB ID DOE/BC/15111-2 **ORDER #** 775021
TITLE *Responsive Copolymers for Enhanced Petroleum Recovery*, Annual Report, September 30, 1999-September 29, 2000, 150 pp.

PUB DATE 02/27/2001

CONTRACTOR University of Southern Mississippi

The objectives of this work were to: synthesize responsive copolymer systems; characterize molecular structure and solution behavior; measure rheological properties of aqueous fluids in fixed geometry flow profiles; and to tailor final polymer compositions for in situ rheology control under simulated conditions. This report focuses on the synthesis and characterization of novel stimuli responsive copolymers, the investigation of dilute polymer solutions in extensional flow and the design of a rheometer capable of measuring very dilute aqueous polymer solutions at low torque.

PUB ID DOE/BC/15111-4 **ORDER #** 792020
TITLE *Responsive Copolymers for Enhanced Petroleum Recovery*, Final Report, September 29, 1998-September 28, 2001, 79 pp.

PUB DATE 02/27/2001

CONTRACTOR University of Southern Mississippi

The objectives of this work were to: (1) synthesize responsive, amphiphilic systems; (2) characterize molecular structure and solution behavior; (3) measure rheological properties of the aqueous fluids including behavior in fixed geometry flow profiles and beds; and (4) to tailor polymer compositions for in situ rheology control under simulated reservoir conditions.

PUB ID DOE/BC/15112-2 **ORDER #** 775023
TITLE *Optimization of Surfactant Mixtures and Their Interfacial Behavior for Advanced Oil Recovery*, Annual Report, September 30, 1998-September 29, 1999, 41 pp.

PUB DATE 02/27/2001

CONTRACTOR Columbia University

The goal of this report is to develop improved extraction processes to mobilize and produce the oil left untapped using conventional techniques. Current chemical schemes for recovering the residual oil have been in general less than satisfactory. High cost of the processes as well as significant loss of chemicals by adsorption on reservoir materials and precipitation has limited the utility of chemical-flooding operations. There is a need to develop cost-effective, improved reagent schemes to

increase recovery from domestic oil reservoirs. The goal of the report was to develop and evaluate novel mixtures of surfactants for improved oil recovery.

PUB ID DOE/BC/15112-3 **ORDER #** 776909

TITLE *Optimization of Surfactant Mixtures and Their Interfacial Behavior for Advanced Oil Recovery*, Annual Report, September 30, 1999-September 30, 2000, 47 pp.

PUB DATE 04/02/2001

CONTRACTOR Columbia University

The goal of this project was to develop improved extraction processes to mobilize and produce the oil left untapped using conventional techniques. Current chemical schemes for recovering the residual oil have been in general less than satisfactory. High cost of the processes as well as significant loss of chemicals by adsorption on reservoir materials and precipitation has limited the utility of chemical-flooding operations. There is a need to develop cost-effective, improved reagent schemes to increase recovery from domestic oil reservoirs. The goal of the report was to develop and evaluate novel mixtures of surfactants for improved oil recovery.

PUB ID DOE/BC/15112-4 **ORDER #** 792223

TITLE *Optimization of Surfactant Mixtures and Their Interfacial Behavior for Advanced Oil Recovery*, Final Report, September 30, 1998-September 29, 2001, 132 pp.

PUB DATE 02/27/2002

CONTRACTOR Columbia University

The objective of this project was to develop a knowledge base that is helpful for the design of improved processes for mobilizing and producing oil left untapped using conventional techniques. The main goal was to develop and evaluate mixtures of new or modified surfactants for improved oil recovery. In this regard, interfacial properties of novel biodegradable n-alkyl pyrrolidones and sugar-based surfactants have been studied systematically. Emphasis was on designing cost-effective processes compatible with existing conditions and operations in addition to ensuring minimal reagent loss.

PUB ID DOE/BC/15113-1 **ORDER #** 794377

TITLE *Development of More Effective Biosurfactants for Enhanced Oil Recovery/Advanced Recovery Concepts Awards*, Semi-Annual Report, October 1, 1998-March 31, 1999, 13 pp.

PUB DATE 05/28/2002

CONTRACTOR University of Oklahoma

The objectives of this project were two fold. First, core displacement studies were done to determine whether microbial processes could recover residual oil at elevated pressures. Second, the importance of biosurfactant production for the recovery of residual oil was studied. In these studies, a biosurfactant-producing microorganism called *Bacillus licheniformis* strain JF-2 was used. This bacterium produces a cyclic peptide biosurfactant that significantly reduces the interfacial tension between oil and brine (7). The use of a mutant deficient in surfactant production and a mathematical MEOR simulator were used to determine the major mechanisms of oil recovery by these two strains.

PUB ID DOE/BC/15125-1 **ORDER #** 780434

TITLE *Exploitation and Optimization of Reservoir Performance in Hunton Formation, Oklahoma, Class Revisit*, Annual Report, April 1, 2000-March 31, 2001, 208 pp.

PUB DATE 05/01/2001

CONTRACTOR The University of Tulsa

This report presents the work done so far on Hunton Formation in West Carney Field in Lincoln County, Oklahoma. West Carney Field produces oil and gas from the Hunton Formation. The field was developed starting in 1995. Some of the unique characteristics of the field include decreasing water oil and ratio over time, decreasing gas-oil ratio at the beginning of production, inability to calculate oil reserves in the field based on long data, and sustained oil rates rates over long periods of time.

PUB ID DOE/BC/15125-3 **ORDER #** 793150

TITLE *Exploitation and Optimization of Reservoir Performance in Hunton Formation, Oklahoma, Budget Period I, Class Revisit*, Final Report, March 7, 2000-March 6, 2002, 395 pp.

PUB DATE 04/02/2002

CONTRACTOR The University of Tulsa

This report explains the unusual characteristics of West Carney Field based on detailed geological and engineering analyses. A geological history that explains the presence of mobile water and oil in the reservoir was proposed. The combination of matrix and fractures in the reservoir explains the reservoir's flow behavior. We confirm our hypothesis by matching observed performance with a simulated model and develop procedures for correlating core data to log data so that the analysis can be extended to other, similar fields where the core coverage may be limited.

PUB ID DOE/BC/15129-1 **ORDER #** 784128

TITLE *Improved Oil Recovery from Upper Jurassic Smackover Carbonates through the Application of Advanced Technologies at Womack Hill Oil Field, Choctaw and Clarke Counties, Eastern Gulf Coastal Plain, Class II, Annual Report, May 1, 2000-April 30, 2001, 89 pp.*

PUB DATE 08/06/2001

CONTRACTOR The University of Alabama

The principal objectives of this project were to: increase the productivity and profitability of the Womack Hill Field Unit, thereby extending the economic life of this Class II Reservoir and transferring effectively and in a timely manner the knowledge gained and technology developed from this project to producers who are operating other domestic fields with Class II Reservoirs. Efforts for Year 1 of this project has been reservoir characterization, which has included three (3) primary tasks: geoscientific reservoir characterization, petrophysical and engineering property characterization, and microbial characterization.

PUB ID DOE/BC/15192-1 **ORDER #** 783391

TITLE *Assessment of Hydrocarbon Seepage on Lands Belonging to Fort Peck Tribes: Soil Geochemistry Application on Aeromagnetic Landsat Lineament, and 3D Seismic Anomalies, Semi-Annual Report, June 15, 2000-December 15, 2000, 36 pp.*

PUB DATE 07/23/2001

CONTRACTOR Fort Peck Assiniboine & Sioux Tribes

The following work was performed: 1) identified three test areas for Phase I, 2) selected nine surface exploration methods for comparison, 3) contracted six geochemical companies for laboratory analysis and interpretation, 4) sub-contracted one surface geochemical method for field collection and analysis, 5) acquired free data for one surface exploration method, 6) collected samples from 27 sites in Area 7 and 210 sites in Area 6, and 7) began the database creation, comparison, mapping, and interpretation of all data from the two sampled areas.

PUB ID DOE/BC/15192-2 **ORDER #** 793651

TITLE *Phase II Interim Report-Assessment of Hydrocarbon Seepage Detection Methods on the Fort Peck Reservation, Northeast Montana, Semi-Annual Report, June 15, 2001-December 15, 2001, 219 pp.*

PUB DATE 04/23/2002

CONTRACTOR Fort Peck Assiniboine & Sioux Tribes

The following work was performed: 1) collected reconnaissance micro-magnetic data and background field data for Area 1, 2) identified and collected soil sample data in three anomalous regions of Area 1, 3) sampled soils in Northwest Poplar Oil Field, 4) graphed, mapped, and interpreted all data areas listed above, 5) registered for the AAPG Penrose Conference on Hydrocarbon Seepage Mechanisms and Migration (postponed from 9/16/01 until 4/7/02 in Vancouver, B.C. Results include the identification and confirmation of an oil and gas prospect in the northwest part of Area 1 and the verification of a potential shallow gas prospect in the West Poplar Area. Correlation of hydrocarbon micro-seepage to TM tonal anomalies needs further data analysis.

PUB ID DOE/BC/15205-1 **ORDER #** 790847

TITLE *Characterization of Mixed Wettability at Different Scales and its Impact on Oil Recovery Efficiency, Annual Report, August 4, 2000-August 31, 2001, 176 pp.*

PUB DATE 01/16/2002

CONTRACTOR The University of Texas at Austin

The objectives of this project was to: (1) quantify the pore scale mechanisms that determine the wettability state of a reservoir, (2) study the effect of crude oil, brine and mineral compositions in the establishment of mixed wet states, (3) clarify the effect of mixed - wettability on oil displacement efficiency in waterfloods, (4) develop a new tracer technique to measure wettability, fluid distributions, residual saturation's and relative permeabilities, and (5) develop methods for properly incorporating wettability in up-scaling from pore to core to reservoir scales.

PUB ID DOE/BC/15209-2 **ORDER #** 773362

TITLE *Increased Oil Recovery from Mature Oil Fields Using Gelled Polymer Treatments, Annual Report, June 16, 1999-June 15, 2000, 61 pp.*

PUB DATE 01/22/2001

CONTRACTOR The University of Kansas, Center for Research Inc.

This report describes the progress of the first year of a three-year research program. This program is aimed at reducing barriers to the widespread use of gelled polymer treatments by (1) developing methods to predict gel behavior during placement in matrix rock and fractures, (2) determining the persistence of permeability reduction after gel placement, and (3) developing methods to design production well treatments to control water production.

PUB ID DOE/BC/15209-3 **ORDER #** 776495

TITLE *Increased Oil Recovery from Mature Oil Fields Using Gelled Polymer Treatments*, Semi-Annual Report, June 16, 2000-December 16, 2000, 13 pp.

PUB DATE 03/28/2001

CONTRACTOR The University of Kansas, Center for Research Inc.

Gelled polymer treatments were applied to oil reservoirs to increase oil production and to reduce water production by altering the fluid movement within the reservoir. This report is aimed at reducing barriers to the widespread use of these treatments by developing methods to predict gel behavior during placement in matrix rock and fractures, determining the persistence of permeability reduction after gel placement, and by developing methods to design production well treatments to control water production. Procedures were developed to determine the weight-average molecular weight and average size of polyacrylamide samples in aqueous solutions.

PUB ID DOE/BC/15209-4 **ORDER #** 794293

TITLE *Increased Oil Recovery from Mature Oil Fields Using Gelled Polymer Treatments*, Annual Report, June 16, 2000-June 16, 2001, 64 pp.

PUB DATE 05/21/2002

CONTRACTOR The University of Kansas, Center for Research Inc.

This program was aimed at reducing barriers to the widespread use of gelled polymer treatments by (1) developing methods to predict gel behavior during placement in matrix rock and fractures, (2) determining the persistence of permeability reduction after gel placement, and (3) developing methods to design production well treatments to control water production.

PUB ID DOE/BC/15211-10 **ORDER #** 773827

TITLE *A Pore-Network Model of In-Situ Combustion in Porous Media*, Topical Report, January 2001, 31 pp.

PUB DATE 01/29/2001

CONTRACTOR University of Southern California

In this report the use of dual pore networks (pores and solid sites) for modeling the effect of the microstructure on combustion processes in porous media is considered. The model accounts for flow and transport of the gas phase in the pore-space, where convection predominates, and for heat transfer by conduction in the solid phase. Gas phase flow in the pore and throats is governed by Darcy's law.

PUB ID DOE/BC/15211-11 **ORDER #** 775024

TITLE *Time Scaling of the Rates of Produced Fluids in Laboratory Displacements*, Topical Report, February 2001, 43 pp.

PUB DATE 01/27/2001

CONTRACTOR University of Southern California

In this report, the use of an asymptotic method, based on the time scaling of the ratio of produced fluids, to infer the relative permeability exponent of the displaced phase near its residual saturation, for immiscible displacements in laboratory cores was proposed. Sufficiently large injection rates, the existence of a power law can be detected, and its exponent inferred, by plotting in an appropriate plot the ratio of the flow rates of the two fluids at the effluent for some time after breakthrough.

PUB ID DOE/BC/15211-13 **ORDER #** 781148

TITLE *Investigation of Multiscale and Multiphase Flow, Transport and Reaction in Heavy Oil Recovery Processes*, Annual Report, May 6, 2000-May 5, 2001, 300 pp.

PUB DATE 05/29/2001

CONTRACTOR University of Southern California

This report is an investigation of various multi-phase and multiscale transport and reaction processes associated with heavy oil recovery. The thrust areas of the project include the following: Internal drives, vapor-liquid flows, combustion and reaction processes, fluid displacements and the effect of instabilities and heterogeneities and the flow of fluids with yield stress. These find respective applications in foamy oils, the evolution of dissolved gas, internal steam drives, the mechanics of concurrent and countercurrent vapor-liquid flows, associated with thermal methods and steam injection, such as SAGD, the in-situ combustion, the upscaling of displacements in heterogeneous media and the flow of foams, Bingham plastics and heavy oils in porous media and the development of wormholes during cold production.

PUB ID DOE/BC/15211-14 **ORDER #** 784112

TITLE *Investigation of Multiscale and Multiphase Flow, Transport and Reaction in Heavy Oil Recovery Processes*, Annual Report, May 1999-May 2000, 216 pp.

PUB DATE 08/06/2001

CONTRACTOR University of Southern California

This project is an investigation of various multi-phase and multiscale transport and reaction processes associated with heavy oil recovery. The thrust areas of the project

include the following: Internal drives, vapor-liquid flows, combustion and reaction processes, fluid displacements and the effect of instabilities and heterogeneities and the flow of fluids with yield stress. These find respective applications in foamy oils, the evolution of dissolved gas, internal steam drives, the mechanics of concurrent and countercurrent vapor-liquid flows, associated with thermal methods and steam injection, such as SAGD, in-situ combustion, upscaling of displacements in heterogeneous media and flow of foams, Bingham plastics and heavy oils in porous media, and development of worm-holes during cold production.

PUB ID DOE/BC/15211-15 **ORDER #** 784395

TITLE *An Effective Continuum Model for the Liquid-to-Gas Phase Change in a Porous Medium Driven by Solute Diffusion: I. Constant Pressure Decline Rates*, Topical Report, July 2001, 44 pp.

PUB DATE 08/15/2001

CONTRACTOR University of Southern California

This report, focuses on the isothermal gas phase growth from a supersaturated, slightly compressible, binary liquid in a porous medium. This is driven by mass transfer, the extent of which is controlled by the application of either a constant-rate decline of the system pressure or the withdrawal of the liquid at a constant rate. This report deals with the first process. Pressure depletion due to constant-rate liquid withdrawal is analyzed in a companion report.

PUB ID DOE/BC/15211-16 **ORDER #** 784396

TITLE *An Effective Continuum Model for the Liquid-to-Gas Phase Change in a Porous Medium Driven by Solute Diffusion: II. Constant Liquid Withdrawal Rates*, Topical Report, July 2001, 30 pp.

PUB DATE 08/15/2001

CONTRACTOR University of Southern California

This report describes the development of an effective continuum model to describe the nucleation and subsequent growth of a gas phase from a supersaturated, slightly compressible binary liquid in a porous medium, driven by solute diffusion. This report also focuses on the processes resulting from the withdrawal of the liquid at a constant rate. As before, the model addresses two stages before the onset of bulk gas flow, nucleation and gas phase growth. Because of negligible gradients due to gravity or viscous forces, the critical gas saturation, is only a function of the nucleation fraction.

PUB ID DOE/BC/15211-17 **ORDER #** 792462

TITLE *Non-Adiabatic Effects on Combustion Front Propagation in Porous Media: Multiplicity of Steady States*, Topical Report, October 2001, 44 pp.

PUB DATE 03/08/2002

CONTRACTOR University of Southern California

The sustained propagation of combustion fronts in porous media is a necessary condition for the success of an in situ combustion project for oil recovery. Compared to other recovery methods, in situ combustion involves the added complexity of exothermic reactions and temperature-dependent chemical kinetics. In the presence of heat losses, the possibility of ignition and extinction (quenching) exists. In this report, we address the properties of combustion fronts propagating at a constant velocity in the presence of heat losses.

PUB ID DOE/BC/15211-18 **ORDER #** 792463

TITLE *Investigation of Multiscale and Multiphase Flow, Transport and Reaction in Heavy Oil Recovery Processes*, Semi-Annual Report, May 6, 2001-November 5, 2001, 7 pp.

PUB DATE 03/08/2002

CONTRACTOR University of Southern California

The emphasis of this work was on investigating the mechanisms and factors that control the recovery of heavy oil with the objective to improve recovery efficiencies. For this purpose the interaction of flow transport and reaction at various scales from the pore network to the field scales were studied. Particular mechanisms to be investigated included the onset of gas flow in foamy oil production and in in-situ steam drive, gravity drainage in steam processes, the development of sustained combustion fronts and the propagation of foams in porous media. Analytical, computational and experimental methods were utilized to advance the state of the art in heavy oil recovery. Successful completion of this research was expected to lead to improvements in the recovery efficiency of various heavy oil processes.

PUB ID DOE/BC/15211-19 **ORDER #** 795238

TITLE *The Effect of Heterogeneity on In-Situ Combustion: The Propagation of Combustion Fronts in Layered Porous Media*, Topical Report, January 2002, 23 pp.

PUB DATE 06/11/2002

CONTRACTOR University of Southern California

This report extend the approach to heterogeneous sys-

tems, by considering the simpler case of in-situ combustion in layered porous media (and particularly to a two-layer model). Analytical models were developed to delineate the combined effects of fluid flow, reaction and heat transfer on the dynamics of combustion fronts in layered porous media, using as parameters the thermal coupling between the layers, the heat transfer to the surroundings and the permeability contrast.

PUB ID DOE/BC/15211-20 **ORDER #** 795239

TITLE *An Effective Continuum Model for the Gas Evolution in Internal Steam Drives*, Topical Report, January 2002, 29 pp.

PUB DATE 06/11/2001

CONTRACTOR University of Southern California

This report examines the gas phase growth from a super-saturated, slightly compressible, liquid in a porous medium, driven by heat transfer and controlled by the application of a constant-rate decline of the system pressure.

PUB ID DOE/BC/15211-9 **ORDER #** 772929

TITLE *On the Upscaling of Reaction-Transport Processes in Porous Media with Fast Kinetics*, Topical Report, June 2000, 34 pp.

PUB DATE 01/09/2001

CONTRACTOR University of Southern California

This report is organized as follows: Provide a brief review of the upscaling constraints of the type (2) for a typical diffusion-reaction system. In this an analogy with two-phase flow in porous media was drawn. Then, using the methodology of QW a problem at the unit cell for the computation of the effective mass transfer coefficient, in processes where local thermodynamic equilibrium applies was derived. This problem is found to be different than in QW, as it depends on the gradients of the macroscale variable, and can be cast in terms of an eigenvalue problem. Two simple, examples, one involving advection-dissolution and another involving drying in a pore network, were presented to illustrate the coupling between scales and to show the quantitative effect in case this coupling was neglected.

PUB ID DOE/BC/15212-1 **ORDER #** 776494

TITLE *Development of Reservoir Characterization Techniques and Production Models for Exploiting Naturally Fractured Reservoirs*, Semi-Annual Report, July 1, 2000-December 31, 2000, 49 pp.

PUB DATE 03/28/2001

CONTRACTOR The University of Oklahoma

This report focuses on integrating geoscience and engineering data to develop a consistent characterization of the naturally fractured reservoirs. During this reporting period, effort was focused on relating seismic data to reservoir properties of naturally fractured reservoirs, scaling well log data to generate interwell descriptors of these reservoirs, enhancing and debugging a naturally fractured reservoir simulator, and developing a horizontal wellbore model for use in the simulator.

PUB ID DOE/BC/15212-2 **ORDER #** 784394

TITLE *Development of Reservoir Characterization Techniques and Production Models for Exploiting Naturally Fractured Reservoirs*, Semi-Annual Report, January 1, 2001-June 30, 2001, 49 pp.

PUB DATE 08/15/2001

CONTRACTOR The University of Oklahoma

Research continues on characterizing and modeling the behavior of naturally fractured reservoir systems. Work has progressed on developing techniques for estimating fracture properties from seismic and well log data, developing naturally fractured wellbore models, and developing a model to characterize the transfer of fluid from the matrix to the fracture system for use in the naturally fractured reservoir simulator.

PUB ID DOE/BC/15246-1 **ORDER #** 792489

TITLE *Marginal Expense Oil Well Wireless Surveillance (MEOWWS)*, Final Report, January 1999-July 2000, 45 pp.

PUB DATE 03/11/2002

CONTRACTOR Hunter Edison Oil Development

The objective of this study was to identify and field test a new, low-cost, wireless oil well surveillance system. A variety of suppliers and technologies were considered. One supplier and system was chosen that was low-cost, new to the oil field, and successfully field tested.

PUB ID DOE/BC/15311-1 **ORDER #** 773283

TITLE *Surfactant Concentration and End Effects on Foam Flow in Porous Media*, TR-120, Topical Report, October 2000, 43 pp.

PUB DATE 01/17/2001

CONTRACTOR Stanford University (SUPRI)

This project studies foam flow behavior at a variety of surfactant concentrations using experiments and a numerical model. Thus, the foam behavior examined spans from strong to weak.

PUB ID DOE/BC/15311-2 **ORDER #** 773294**TITLE** *Scaling of Counter-Current Imbibition Process in Low-Permeability Porous Media, TR-121*, Topical Report, December 2000, 43 pp.**PUB DATE** 01/17/2001**CONTRACTOR** Stanford University (SUPRI)

This project presents the recent work on imaging imbibition in low permeability porous media (diatomite) with X-ray computed tomography. The viscosity ratio between nonwetting and wetting fluids is varied over several orders of magnitude yielding different levels of imbibition performance. Also performed is mathematical analysis of counter-current imbibition processes and development of a modified scaling group incorporating the mobility ratio.

PUB ID DOE/BC/15311-3 **ORDER #** 776933**TITLE** *Doublets and Other Allied Well Patterns, SUPRI TR-122*, Topical Report, December 2000, 110 pp.**PUB DATE** 04/02/2001**CONTRACTOR** Stanford University

This report looks at a host of balanced patterns for unity mobility ratio. The geometries and rates ranged broadly. It was found that whenever total production and injection were equal, considerable insight on the flow equations and the fluid movement can be gained. Balanced patterns, where the wells are arrayed around a single injector or a single producer, we found that simple equations can define the nature of steady state flow lines and geometries of the flow paths, and their breakthrough behavior. When the rates are not equal, but still are balanced, the geometries are more complex, but still amenable to analytic solution.

PUB ID DOE/BC/15311-4 **ORDER #** 777917**TITLE** *Porosity and Permeability Evolution Accompanying Hot fluid Injection into Diatomite, SUPRI TR-123*, Topical Report, March 2001, 27 pp.**PUB DATE** 04/18/2001**CONTRACTOR** Stanford University

An experimental study of silica dissolution was performed

to probe the evolution of permeability and porosity in siliceous diatomite during hot fluid injection such as water or steam flooding. Two competing mechanisms were identified. Silica solubility in water at elevated temperature causes rock dissolution thereby increasing permeability; however, the rock is mechanically weak leading to compressing of the solid matrix during injection. Permeability and porosity can decrease at the onset of fluid flow. A laboratory flow apparatus was designed and built to examine these processes in diatomite core samples.

PUB ID DOE/BC/15311-5 **ORDER #** 783114**TITLE** *A Numerical Analysis of the Single-Well Steam Assisted Gravity Drainage (SW-SAGD) Process, SUPRI TR-124*, Topical Report, June 2001, 30 pp.**PUB DATE** 07/16/2001**CONTRACTOR** Stanford University

Results from this study, include cumulative recoveries, temperature distributions, and production rates. It was found that cyclic steaming of the reservoir offers the most favorable option for heating the near-wellbore area to create conditions that improve initial steam-assisted gravity (SAGD) response. More favorable reservoir conditions such as low viscosity, thick oil zones, and solution gas, improved reservoir response. Under unfavorable conditions, response was limited.

PUB ID DOE/BC/15311-6 **ORDER #** 783117**TITLE** *A Streamline Approach for History-Matching Production Data, SUPRI TR-125*, Topical Report, June 2001, 36 pp.**PUB DATE** 07/16/2001**CONTRACTOR** Stanford University

This report evaluates an apparatus designed to allow the use silicon-wafer micromodels over a wide range of pressures, as required for solution gas drive experiments. Specifically, a pressure vessel was fabricated to apply the necessary confining pressure to the micromodel. A system of valves and tubing was constructed to provide pressure control for the system. A syringe pump allowed for constant volume expansion rate during pressure decline experiments. Observations of the porous medium were made through a sapphire window using a high-power (200X) microscope.

PUB ID DOE/BC/15311-7 **ORDER #** 783118**TITLE** *Visualization of Solution Gas Drive in Viscous Oil, SUPRI TR-126*, Topical Report, March 2001, 75 pp.

PUB DATE 07/16/2001

CONTRACTOR Stanford University

Several experimental studies of solution gas drive are available in this report. Almost all of the studies have used light oil. Solution gas drive behavior, especially in heavy oil reservoirs, is poorly understood. Experiments were performed in which pore-scale solution gas drive phenomena were viewed in water/carbon dioxide and viscous oil/carbon dioxide systems. A new pressure vessel was designed and constructed to house silicon-wafer micromodels that previously operated at low (<3 atm) pressure. The new apparatus is used for the visual studies.

PUB ID DOE/BC/15311-8 **ORDER #** 786051

TITLE *Heavy and Thermal Oil Recovery Production Mechanisms, SUPRI TR-127, Annual Report, August 2001, 214 pp.*

PUB DATE 10/02/2001

CONTRACTOR Stanford University

The program spans a spectrum of topics and is divided into five categories: (1) multiphase flow and rock properties, (2) hot fluid injection, (3) primary heavy-oil production, (4) reservoir definition, and (5) in-situ combustion.

PUB ID DOE/BC/15311-9 **ORDER #** 793652

TITLE *Experimental and Analytical Study of Multidimensional Imbibition in Fractured Porous Media, SUPRI TR-129, Annual Report, October 2001, 31 pp.*

PUB DATE 04/22/2002

CONTRACTOR Stanford University

Using an X-ray computerized tomography (CT) scanner, and a novel, CT-compatible core holder, performed a series of experiments to study air and oil expulsion from rock samples by capillary imbibition of water in a three-dimensional geometry. The air-water system was useful in that a relatively large number of experiments can be conducted to delineate physical processes. Different injection rates and fracture apertures were utilized. Two different fracture flow regimes were identified. The "filling-fracture" regime shows a plane source that grows in length due to relatively slow water flow through fractures. In the second, "instantly-filled fracture" regime, the time to fill the fracture is much less than the imbibition time.

PUB ID DOE/FT/97278-1 **ORDER #** 792548

TITLE *Characterization of Phase and Emulsion Behavior, Surfactant Retention, and Oil Recovery for Novel*

Alcohol Ethoxycarboxylate Surfactant, Semi-Annual Report, October 1, 1999-April 1, 2000, 7 pp.

PUB DATE 03/13/2002

CONTRACTOR Clark Atlanta University

Electrical conductivity measurements for middle, bottom, and top phases, as well as bottom/middle, and middle/bottom conjugate pair phases of the NEODOX 23-4/dodecane/10mM water system were continued from the previous reporting period. Electrical conductivity of the mixture decreased as the fraction of volume of the middle phase was increased and vice versa. Also inversion phenomena was observed. Following this, more emulsion studies at various temperatures were progresses. A theoretical model to predict the conductivity measurements using Maxwell equations was developed and sensitivity analyses to test the performance of the model was completed. Surtek, Golden, CO, our industrial partner in this project, investigated the suitability of the surfactant for enhanced oil recovery employing coreflooding techniques and observed lower surfactant and hydrocarbon recovery.

PUB ID DOE/ID/13421-3 **ORDER #** 790862

TITLE *Evaluation of Reservoir Wettability and its Effect on Oil Recovery, Final Report, October 2001, 377 pp.*

PUB DATE 01/17/2002

CONTRACTOR New Mexico Institute of Mining & Technology

The objectives of this five-year project were: (1) to achieve improved understanding of the surface and interfacial properties of crude oils and their interactions with mineral surfaces, (2) to apply the results of surface studies to improve predictions of oil production from laboratory measurements, and (3) to use the results of this research to recommend ways to improve oil recovery by waterflooding.

PUB ID DOE/PC/96223-05 **ORDER #** 789941

TITLE *Surfactant-Polymer Interaction for Improved Oil Recovery, Final Report, October 1998-September 1999, 57 pp.*

PUB DATE 01/07/2002

CONTRACTOR Prairie View A&M State University

The goal of this research was to use the interaction between a surfactant and a polymer for efficient displacement of tertiary oil by improving slug integrity, oil solubility in the displacing fluid and mobility control.

Surfactant-polymer flooding has been shown to be highly effective in laboratory-scale linear floods. The focus of this proposal is to design an inexpensive surfactant-polymer mixture that can efficiently recover tertiary oil by avoiding surfactant slug degradation and viscous/heterogeneity fingering.

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TITLE *Summary of Data from DOE-Subsidized Field Trial #1 of Downhole Oil/Water Separator Technology, Texas Well Bilbrey 30-Federal No. 5 Lea County, New Mexico, Topical Report, May 2000, 39 pp.*

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This reports, how DOWS technology reduced the quality of produced water that is handled at the surface by separating it from the oil downhole and simultaneously injecting it underground. The two primary components of a DOWS system are an oil/water separation system and at least one pump to lift oil to the surface and inject the water. Two basic types of DOWS have been developed -- one type using hydrocyclones to mechanically separate oil and water and one relying on gravity separation that takes place in the well bore.

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TITLE *Analysis of Data from a Downhole Oil/Water Separator Field Trial in East Texas, Topical Report, February 2001, 60 pp.*

PUB DATE 04/18/2001

CONTRACTOR Argonne National Laboratory

Downhole oil/water separator (DOWS) technology is available to separate oil from produced water at the bottom of an oil well. Produced water can be injected directly to a disposal formation rather than lifting it to the surface, treating it there, and reinjecting it. Because of a lack of detailed performance data on DOWS systems, the U.S. Department of Energy (DOE) provided funding to secure DOWS performance data. A large U.S. oil and gas operator offered to share its data with Argonne National Laboratory. This report summarizes data from the DOWS installation in eastern Texas.

Computer Software & Supporting Documentation

Personal Computer Programs are available on 3.5" HD 1.4 MB disks. The software can also be downloaded from the NPOT website at

www.npto.doe.gov/software/softindx.html

1. **DOE/BC-88/1/SP. EOR Predictive Models: Handbook for Personal Computer Versions of Enhanced Oil Recovery Predictive Models.** BPO Staff. February 1988. 76 pp. NTIS Order No. DE89001204. FORTRAN source code and executable programs for five EOR Predictive Models shown below are available. The five recovery processes modeled are Steamflood, In-Situ Combustion, Polymer, Chemical, and CO₂ Miscible Flooding. The models are available individually. Min Req.: IBM PC/XT, PS-2, or compatible computer with 640 Kbytes of memory.

a. **DOE/BC-86/6/SP. Steamflood Predictive Model,** Supporting Technology for Enhanced Oil Recovery. Dec 1986, 594 pp. NTIS Order No. DE87001219.

b. **DOE/BC-86/7/SP. In-Situ Combustion Predictive Model,** Supporting Technology for Enhanced Oil Recovery. Dec 1986, 263 pp. NTIS Order No. DE86000264.

c. **DOE/BC-86/10/SP. Polymer Predictive Model,** Supporting Technology for Enhanced Oil Recovery. Dec 1986, 394 pp. NTIS Order No. DE87001207.

d. **DOE/BC-86/10/SP. Polymer/Waterflood Predictive Model: Windows Version 1.1:** June 1995. This is an update to the Polymer Flood Predictive Model (PFFM) released in 1986. An addendum is available describing the updated economic cost and tax functions included in this release. This serves as a supplement to the original PFFM user's manual. This version runs out of the Microsoft Windows environment and supports post-processing graphics. Min Req.: 80386, 4 Mbytes extended memory, and Windows v3.1.

e. **DOE/BC-86/11/SP. Chemical Flood Predictive Model,** Supporting Technology for Enhanced Oil Recovery. Dec 1986, 360 pp. NTIS Order No. DE87001208.

f. **DOE/BC-86/12/SP.** *CO₂ Miscible Flood Predictive Model*, Supporting Technology for Enhanced Oil Recovery. Dec 1986, 469 pp. NTIS Order No. DE87001209.

g. **DOE/BC-86/12/SP.** *CO₂ Miscible Predictive Model: Windows Version 1.1*: 1995. This is an update to the CO₂ Miscible Flood Predictive Model (CO₂PM) released in 1986. This version runs out of the Microsoft Windows environment and supports post-processing graphics. Min Req.: 80386, 4 Mbytes extended memory, and Windows v3.1.

2. **DOE/BC-95/2/SP.** *Infill Drilling Predictive Model: User's Guide and Documentation Manual - Release 1.2.0*, Feb. 1995 for the PC. FORTRAN source code and executable program. Min Req.: 80386/80387, DOS v3.1, and 2 Mbytes extended memory.

a. **DOE/BC-95/2/SP.** *Infill Drilling Predictive Model: Windows Version 1.1*: June 1995. This is an update to the Infill Drilling Predictive Model (IDPM) released in 1995. This version runs out of the Microsoft Windows environment and supports post-processing graphics. Min Req.: 80386, 4 Mbytes extended memory, and Windows v3.1.

3. **DOE/BC/14960-7.** *CO₂ Prophet: Water and CO₂ Flood Prediction Software*. CO₂ Prophet, conceived by Texaco Exploration and Production Technology Department (EPTD), was partially developed as part of the DOE Class I cost-share program "Post Waterflood, CO₂ Flood in a Light Oil, Fluvial Dominated Deltaic Reservoir" under DOE Contract No. DE-FC22-93BC14960. Min Req.: 80386/80387 and 4 Mbytes extended memory and will run under the Microsoft Windows environment. DOE does not provide technical support for this application.

4. **DOE/BC-89/3/SP.** *Handbook for Personal Computer Version of BOAST II: A Three-Dimensional, Three-Phase Black Oil Applied Simulation Tool*. Bartlesville Project Office. January 1989. 82 pp. NTIS Order No. DE89000725. FORTRAN source code and executable program. Min. Req.: IBM PC/AT, PS-2, or compatible computer with 640 Kbytes of memory.

5. **NIPER-542.** *BOAST-VHS: FORTRAN source code*

and executable program. User's Guide and Documentation Manual, National Institute for Petroleum and Energy Research (NIPER). January 1992. 92 pp. NTIS Order No. DE92001021. Min. Req.: IBM PC/AT, PS-2, or compatible computer with 640 Kbytes of memory. Math coprocessor optional.

6. **DOE/BC/14831-18.** *BOAST-3: FORTRAN Source code and executable program*. User's Guide and Documentation Manual. Bartlesville Project Office, September 21, 1996 (version 1.6). BOAST-3 is a modified version of BOAST-II containing postprocessors COLORGRID and B3PLOT2. The executable was compiled with the 32-bit Microsoft PowerStation FORTRAN and is 100% compatible with Windows. Min Req.: 386/486 PC environment.

7. **BOAST98:** (Version 4.2.3) FORTRAN 90 source code and executable program. Visual, dynamic, and interactive update of BOAST3. Rock region saturation corrected by WOC and GOC. Interacts with EdBOAST. Beta tested. User's Guide and Documentation Manual. National Petroleum Technology Office by TRW Petroleum Technologies, December 1998. Compiled with Lahey FORTRAN 90 and ISS/Interacter. Min. Req. Windows95, Windows NT, or Windows 3.1 with Win32s installed. Recommend 32 MB memory. Anticipate need of 40 to 100 MB disk space.

8. **EdBOAST:** Version 1.3.3, FORTRAN 90 source code and executable program. Dialog oriented reservoir data editor for input files directed to BOAST98 and BOAST3. Graphic plots and spreadsheet import/export features. Interacts with BOAST98. Beta tested. User's Guide. National Petroleum Technology Office by TRW Petroleum Technologies, December 1998. Compiled with Lahey FORTRAN 90 AND ISS/Interacter. Min. Req. Windows98, Windows NT, or Windows 3.1 with Win32s installed. Recommend 32 MB memory.

9. **DOE/BC-91/2/SP.** *MASTER: Miscible Applied Simulation Techniques for Energy Recovery - Version 2.0*. User's Guide and Technical Manual. Morgantown Energy Technology Center (METC). February 1991. 192 pp. NTIS Order No. DE91002222. FORTRAN source code and executable program. Min. Req.: See Users Guide.

10. **NIPER-705. PC-GEL: A Three-Dimensional, Three-Phase, Permeability Modification Simulator.** IIT Research Institute, National Institute for Petroleum and Energy Research (NIPER). October 1993. 190 pp. NTIS Order No. DE94000104. FORTRAN source code and executable program. Min. Req.: IBM PC/AT, PS-2, or compatible computer with 640 Kbytes of memory Math coprocessor optional

11. **DOE/BC/20006-18. TRACRL-Single-Well Chemical Tracer Test Simulator.** A deliverable as part of "The Single-Well Chemical Tracer Method for Measuring Residual Oil Saturation-Final Report." Bartlesville Energy Technology Center (BETC), predecessor to National Institute for Petroleum and Energy Research (NIPER). October 1980. 190 pp. FORTRAN source code and sample input datasets for both PC and Apple environments. Executable program for the PC.

12. **DOE/PC/91008-0042. NPC Public Database: (NPCPUBDB.GEO)** Database developed for the National Petroleum Council (NPC) for its 1984 assessment of the nation's enhanced oil recovery (EOR) potential. The technical data description is at the reservoir level. Included with the database are the Appendices from the "TORIS Data Preparation Guidelines" defining the data elements in the database. Available in ASCII or Spreadsheet format.

13. **DOE/PC/91008-0151. Crude Oil Analysis Database: COADB, v2.0, 1995.** Database contains information on 9,056 crude oil analyses performed at the National Institute for Petroleum and Energy Research (NIPER). A printed user's guide is available by request. The database is also available on disk. Min Reqs.: DOS v5.0, 80386 processor, 4 MB RAM, and 20 MB hard disk memory.

14. **Risk Analysis and Decision Making Software:**

a. **Neuro3 - Neural Network Software:** Neural networks are systems that are constructed to use some organizational principles resembling those of the human brain. They are information-processing systems that demonstrate the ability to learn, recall, and generalize from training patterns or data. They are good at tasks such as pattern matching and classification, data clustering, and forecasting. Common oil and gas applications include forecasting of reservoir properties from wireline log signatures, extension of

reservoir properties for simulation, and seismic interpretation. While this application was written for the oil and gas community, it is generic enough to apply to any problem for data-mining, correlation, or categorization needs. The application is a 32-bit MS Windows application. It contains an extensive help system with a tutorial and background information on neural networks. The application also has a spreadsheet interface to allow import and export of external data sets.

b. **TREE2000-Decision Tree Software:** Decision tree software embodies a highly customizable tool for risk management and informed decision making. Variables such as price, production, and operating costs contain unknowns that must be accounted for when looking at the value of a given decision or project. Decision tree software allows you to apply all the information you have on various unknowns and give you the "big picture" of the situation, showing how that information affects your future and current choices. This assistance will illustrate possible outcomes of decisions and better inform you of where to invest effort in reducing uncertainties. The application is a 32-bit MS Windows application. It contains a help system with an example and background information on decision tree construction.

15. **DOE/PC/91008-0261. FRAC-EXPLORE:**

Analyzes the characteristics and patterns of subsurface lineaments, fractures, and other geological features for the purpose of identifying the locations of potential subsurface oil and gas reservoirs. Developed at the National Institute for Petroleum and Energy Research (NIPER) by BDM-Oklahoma, Inc. A printed user's guide is available by request. Min Req. Windows v3.1, 6 MB hard disk space, 4 MB RAM, VGA color monitor configured to at least 800x600 resolution, and an 80386 processor.

16. **Microbial Transport Simulator:** The microbial transport simulator (MTS) is a three-dimensional, three-phase, multiple-component numerical model that permits the study of the transport of microorganisms and nutrients in porous media. Microbial parameters incorporated into MTS include: microbial growth and decay, microbial deposition, chemotaxis, diffusion, convective dispersion, tumbling, and nutrient consumption. Governing equations for microbial and nutrient transport are coupled with

continuity and flow equations under conditions appropriate for a black oil reservoir. The model's mathematical formulations and preparation procedures of data files for conducting simulations using MTS are described in the electronic manual. Min. Req.: IBM PC/AT, PS-2, or compatible computer with 640 Kbytes of memory. Math coprocessor optional.

17. DOE/PC/91008-0346. *User's Guide and Documentation Manual*: The improved PC-GEL permeability modification simulator is an improved version of National Institute for Petroleum and Energy Research's (NIPER's) PC-GEL permeability modification simulator. It is developed under a cooperative research and development agreement (CRADA) established between BDM-Oklahoma, Inc. and Schlumberger Dowell. In addition to the features included in the PC-GEL simulator, the improved version includes a radial model, a thermal energy equation in both rectangular and cylindrical coordinates, $(r,0,z)$, a modified version of Schlumberger Dowell's wellbore simulator, a fully implicit time-stepping option, and the temperature-dependent gelation kinetics and fluid rheology of an inorganic delayed gel system (DGS). Detailed description of the development of these new features is reported in a topical report entitled, "Development of an Improved Permeability Modification Simulator."

18. DOE/PC/91008-0361. *Maganom Software USER'S GUIDE*: Maganom is a computer program for modeling magnetic data over 2-D structure. The program computes the magnetic anomalies across 2-D structure (models) to allow you to compare observed and computed magnetic data across the model structure. If a match between the computed and the observed magnetic values is unsatisfactory, you construct a new model and rerun Maganom to recalculate new magnetic values. In this way, you can continue calculations until you obtain a satisfactory match between the observed and the calculated values.

19. DOE/PC/91008-0349. *Gravanom Software USER'S GUIDE*: Gravanom is a computer program for modeling gravity data over 2-D structure. The program computes the gravity anomalies across 2-D structure (models) to allow you to compare observed and computed gravity data across the model structure. If a match between the computed and the observed gravity values is unsatisfactory, you

construct a new model and rerun Gravanom to recalculate gravity values. In this way, you can continue calculations until you obtain a satisfactory match between the observed and the calculated values.

20. DOE/PC/91008-0344. *Development of an Improved Permeability Modification Simulator*: This report describes the development of a permeability modification simulator. The improved simulator is developed through the modification of the existing PC-GEL permeability modification simulator to include a radial, a thermal energy equation, a modified version of Schlumberger Dowell's wellbore simulator, and a fully implicit time-stepping option. The developed simulator describes the flow of the injected fluid in the wellbore, through the perforations, and the reservoir. Flow in the reservoir is three dimensional and includes thermal conduction/convection among the injected fluid, the reservoir formation, the reservoir fluids, the overburden, and the underburden.

21. *Exploration and Production CD-ROM*: A new CD-ROM available from the DOE's National Petroleum Technology Office (NPTO) contains more than 20 programs, database applications, and model documentation fields for the oil and gas industry. The CD also features BOAST '98—the newest version of the DOE's popular software.

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